MAY, 1960
VOL. III, NO. 1

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roblems of Economics

Selected Articles from Soviet Economics Journals in English Translation

IN THIS ISSUE

On the Calculation of Production Inputs

Some Theoretical Problems of National Economic Effectiveness of Utilization of Machines

The Motive Forces of Technological Progress in the USSR at its Present Stage of Development

A Budget That Assures the Soviet Union's Economic and Cultural Progress

Problems of Accumulation and Consumption in the Seven-Year Plan

Some Economic Problems in Industrial Engineering

On the Study of the Current Problems of Territorial Distribution of Productive Forces

Twentieth Century Capitalism

PUBLISHED IN THE UNITED STATES BY
INTERNATIONAL ARTS AND SCIENCES PRESS
156 5th AVENUE • NEW YORK 10, NEW YORK

66-41648

5556-34
HC10
P753
v.3

Problems of Economics

L. III, NO. 1

TABLE OF CONTENTS

MAY 1960

Page

ECONOMIC THEORY

KANTOROVICH: On the Calculation of Production Inputs
(Voprosy Ekonomiki, No. 1, 1960) 3

KOZLOV: Some Theoretical Problems of National Economic Effectiveness of Utilization of Machines
(Nauchnye Doklady Vysshei Shkoly, Ekonomicheskie Nauki, No. 4, 1959) 11

ECONOMIC PRACTICE AND POLICY

ANISIMOV: The Motive Forces of Technological Progress in the USSR at its Present Stage of Development
(Nauchnye Doklady Vysshei Shkoly, Ekonomicheskie Nauki, No. 4, 1959) 16

GARBUZOV: A Budget That Assures the Soviet Union's Economic and Cultural Progress
(Planovoe Khoziaistvo, No. 12, 1959) 23

STRUKOV: Problems of Accumulation and Consumption in the Seven-Year Plan
(Planovoe Khoziaistvo, No. 12, 1959) 30

KHEINMAN: Some Economic Problems in Industrial Engineering
(Voprosy Ekonomiki, No. 1, 1960) 35

REGIONAL ECONOMIC DEVELOPMENT

FEIGIN: On the Study of the Current Problems of Territorial Distribution of Productive Forces
(Voprosy Ekonomiki, No. 1, 1960) 43

ANALYSIS OF WESTERN ECONOMIES

VARGA: Twentieth Century Capitalism
(Mirovaia Ekonomika i Mezhdunarodnye Otnosheniia, No. 1, 1960) 48

PROBLEMS OF ECONOMICS

Selected Articles from Soviet Economics

Journals in English Translation

PROBLEMS OF ECONOMICS is a complete, literal translation, without editorial comment, of articles selected from the following Soviet publications:

VESTNIK LENINGRADSKOGO UNIVERSITETA, SERIIA EKONOMIKI –
JOURNAL OF LENINGRAD UNIVERSITY, ECONOMIC SERIES
VESTNIK MOSKOVSKOGO UNIVERSITETA, SERIIA EKONOMIKI –
JOURNAL OF MOSCOW UNIVERSITY, ECONOMIC SERIES
VESTNIK STATISTIKI – JOURNAL OF STATISTICS
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PROMISHLENNO-EKONOMICHESKAIA GAZETA – INDUSTRIAL-ECONOMIC GAZETTE
SOTSIALISTICHESKII TRUD – SOCIALIST LABOR

Articles from other publications are included from time to time if they are considered of sufficient interest for translation.

PROBLEMS OF ECONOMICS is published as a service for purposes of information and education. Twelve issues per year. Subscription rate: $50.00 per year; $4.50 per copy. Editor and Publisher: Myron E. Sharpe.

ADVISORY COMMITTEE: Dr. Gregory Grossman, Department of Economics, University of California, Berkeley, California; Mr. John P. Hardt, Secretary, Operations Research Office, Johns Hopkins University, Bethesda, Md.; Mr. Leon M. Herman, Specialist in Soviet Economics, Legislative Reference Service, The Library of Congress, Washington, D.C.; Dr. Holland Hunter, Department of Economics, Haverford College, Haverford, Pa.; Dr. Lynn Turgeon, Department of Economics, Hofstra College, Hempstead, N.Y.

NOTE: Members of the Advisory Committee make suggestions of articles for translation. The Editor, however, is solely responsible for the final choice of articles and for all other matters pertaining to the magazine.

INTERNATIONAL ARTS AND SCIENCES PRESS
156 5th Avenue, New York 10, N. Y.

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Voprosy Ekonomiki, No. 1, 1960

Kantorovich:

the Calculation of Production Inputs *

cialist society is interested in the maximum saving of
l labor in order to satisfy most fully the needs of all
s members. The saving of labor requires the appro-
te reckoning and estimation of the social labor input
ired for the production of various goods.

e magnitude of the input of social labor-time in the
uction of a given article is not constant but changes
every variation in the productive power of labor. The
r "is determined by various circumstances, among
rs by the average degree of skill of the workmen, the
of science and the degree of its practical application,
ocial organization of production, the scale and effec-
ess of the means of production, and by natural condi-
." (1) The input of social labor is a concrete magni-
, quite definite for the given point of time, given situa-
and conditions. This magnitude cannot, however, be
d directly. In reality, practically no commodity is pro-
d under socially average conditions. Different enter-
es turning out similar commodities do not have the
technical facilities, work in different physical condi-
, and so on. But the magnitude of the social-labor in-
s the same for each unit of the given output, regardless
w it is produced, as each individual unit of a commodi-
but "an average sample of its class."(2) The task is
mpute correctly, on the basis of concrete data for in-
ual labor inputs, the magnitude of social labor inputs
ired for the production of a unit of the given output.

this connection, also, the following problem arises in
list society: how to consider the effect of selecting
r another method of producing a given commodity on
evel of labor inputs in other types of output or in other
rs of production? For with modern, highly developed
ology, the production of different commodities is
ly interrelated. Provision of favorable conditions and
ation of definite resources for the production of one
nodity to a certain extent affect the production con-
ns of other commodities. Therefore, a given operation
e production of a given commodity cannot be examined
lation. To solve this complex problem we deem it
al to examine first a narrower problem, namely, to
tain the effect of selecting a production method for a
commodity on the level of inputs in the production of
types of output within the limits of a certain produc-
complex that puts out several different commodities.
bject here is to determine "the inputs in the complex
whole" per unit of each output, considering the inter-
ions of these inputs. Such inputs may be termed
gate(3) inputs.

***

Let us enumerate some of the initial prerequisites for determining aggregate labor inputs.

1. In determining aggregate labor inputs, account should be taken of the labor inputs in the given operation in the concrete conditions of social production: natural conditions, the attained level of technology, the mastered production methods, the available production facilities and the possibility of their expansion. This operation or the production of the given commodity should be considered not separately from other operations but in the general scheme, in a single aggregate of all operations.

2. Account should be taken only of the labor inputs that are necessary, i.e., are rational for society in the given conditions. Aggregate labor inputs should be computed on the basis of those methods of operation which require the smallest inputs, it being understood that only methods feasible in the given conditions may be considered.

It would be wrong to assume that labor inputs are justified only with the use of the most highly perfected of the practiced or known methods of performing the given operation. In reality, it may be rational to use far from the most highly perfected method, and yet in this case too, the labor inputs should be regarded as necessary. Thus, although electric power costs (and the ultimate labor requirements) at a factory's own electric station may be several times higher than at the district heat and power plants, it may, in a number of cases when there is a shortage of electric power, be expedient for the factory to use its own power station. Thus, in computing aggregate labor inputs, account should be taken of all the necessary inputs in a rational production scheme.

3. Total labor inputs should be considered, i.e., not only the direct labor inputs in the given operation, but also the effect of the chosen method of performing this operation on the inputs necessary for performing other operations. This requirement stems from the unity of all socialist production.

Quite often the introduction of labor-saving conditions in one line of work involves increased labor inputs in other jobs. When that is so, in order to choose the proper method of performing the operation and to determine the required aggregate labor inputs it is necessary to compute and compare the inputs for the whole totality of operations in both variants.

4. Labor inputs should be calculated for normal, average conditions, i.e., for typical natural conditions and average technical facilities. We can compare directly only those inputs of labor which are performed under identical conditions. In practice, however, individual commodities are produced in conditions differing from the average; for labor inputs to be comparable, they should be converted to average inputs.

Hence, in computing aggregate labor inputs, account should be taken of the overall, rational labor inputs that are required for the production of a unit of output, with

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e editors of Voprosy Ekonomiki differ with the author
number of propositions put forward in this article and
d to comment on them critically in an early issue of
agazine.

due consideration for the general plan and proceeding from the average conditions of labor.

In accordance with the above basic prerequisites for computing aggregate labor inputs for each kind of work, we proceed from the minimum average labor inputs required for the performance of this work in the given conditions. If, however, its performance may cause changes in the method of carrying out other operations, account should be taken of the ultimate increase in total labor inputs which its performance will require. This approach, we think, conforms to the actual conditions in which questions of saving social labor must be decided in economic calculations and planning. Thus, in deciding the question of replacing one kind of operation in the plan by another (for instance, building a metal bridge instead of a stone one), the determining consideration would be the saving of social labor as a result of such revision of the plan. Only a correct computation of aggregate labor inputs makes it possible to decide such questions in accordance with the general interests of the state.

The problem of determining the magnitude of aggregate labor inputs will be examined in the present article by means of examples which estimate labor inputs within the scope of a single enterprise. It will be noted that in these examples, in determining aggregate labor inputs and in converting individual labor inputs at a given production sector to average labor inputs, the average referred to is an average for the particular enterprise. Nevertheless we believe that the methods set forth here, as well as the computation procedures evolved in the process of analysis, have a broader significance and can be applied to problems of determining aggregate labor inputs on a wider scale.

***

Let us first examine those simple cases in which there are no obstacles (permanent or temporary) to applying the best possible production methods for each commodity, or, in other words, when nothing restricts the use of the most favorable labor conditions. In this case, the method requiring the least labor input per unit of output can be employed for any amount of output of each commodity; the method chosen for the production of one commodity does not affect the selection of production methods for another commodity. Therefore, the aggregate labor inputs for each commodity can, to a certain extent, be determined independently, by calculating the direct inputs for its production.(4)

Hence, in this case, for this sector there is essentially no problem of converting individual into average labor inputs; aggregate labor inputs coincide with the normative individual inputs.

In actual fact, however, the most favorable conditions for performing a certain operation are limited at each given point of time. It is also unrealistic to assume that there is no interdependence among the magnitudes of labor inputs required for the production of different types of com ties. In modern industry, the interdependence of the puts is extremely great. Therefore, the above meth calculating social labor inputs can hardly be applied actual practice.

Another simple case is when one commodity has t produced by several methods, it being impossible to vide conditions ensuring the minimum labor input fo entire volume of production. In this case, all planne inputs should be considered expedient (since the situ compels the employment of less efficient methods), relating the entire amount of labor to the whole volu output we derive the aggregate labor input per unit c for the given conditions. In other words, the aggrega labor input per unit of output is determined by the av labor input per unit of output.

In concrete conditions, labor inputs do not corresp the computed average inputs: in favorable conditions are lower, and in unfavorable, greater. By comparin labor inputs with the average, we can determine for given conditions the coefficient of conversion of indi to average labor inputs as a ratio of computed labor to those in concrete conditions. This coefficient is g than unity in the first of the above cases and smaller second.

Example 1. For the production of agricultural cro 100 hectares of good fertile land and more than 200 tares of bad land (see Table 1). With the available la resources (3,000 days), a total of 300 hectares (100 good and 200 of the bad land) can be cultivated and 4, centners of crop A produced. Dividing the labor inpu the total output we derive the average labor input pe ner of output — 3,000:4,000 = 0.75 days.

The derived magnitude (0.75 days) is the average input, which in this case corresponds to the aggrega input. On each of the fields the labor input does not spond to the average. The coefficients for convertin vidual to average labor inputs are 0.75:0.5 = 1.5 and 0.75:1.0 = 0.75, respectively.

These very simple procedures of determining agg labor inputs are unsuitable when we have several ki output and when selection of a method for producing kind may affect the methods of producing the others. first procedure (computation of the direct labor inpu unit of output under production conditions where the puts are at a minimum) is inappropriate because the mum labor input cannot be applied to all the outputs taneously. The second procedure (distribution of the available inputs over the entire output) cannot be app because we do not know how much time should be as to any of the output. Consequently, other computing methods are necessary.

We shall describe here two methods which produc

Table 1
Crop A Sowing Plan

Land	Area (hectares)	Yield (centners per hectare)	Output (centners)	Labor input (days)			Coefficien of conversio individual t average inp
				per hectare	per field	per centner	
Good	100	20	2,000	10	1,000	0.5	1.5
Bad	200 or more	10	2,000	10	2,000	1.0	0.75
Total	300		4,000		3,000	0.75	

ame results. The first of these methods is as follows.
ssume some increase in labor resources, while the
age conditions under which it is employed remain un-
ed. Then we determine what amount of the given out-
an be obtained by this increase in the labor resources,
erly applied. Dividing the labor input by a unit of out-
we derive the amount of average labor necessary for
roduction of a unit of output (or for performing a given
ation) under conditions of the general plan, i.e., we
ve the magnitude of aggregate labor inputs. Let us il-
ate the application of this method by examples.(5)
ample 2. Suppose we have two fields: 100 hectares of
and 200 (or more) hectares of bad land. Two crops,
d B, can be cultivated on these fields. The data on
ls and the necessary labor inputs are given in Table 2.
Table 3 we have a certain (initial) sowing plan under
h each field is sown to both crops. The total target is
) centners of crop A and 750 centners of crop B, and the
labor input, 3,000 man-days. This is not an optimal plan,
does not consider which crop could best be grown on
h land.
or these same conditions let us draw up a better plan
h, with the same total labor inputs and the same output
rop B, would produce the highest possible output of crop
t is best to cultivate crop B on the good land, as here it
ls an output three times as high as on the bad land,
whereas the output of crop A is, respectively, only twice as high. To obtain 750 centners of crop B let us plant it on 50 hectares of the good land, using the other 50 hectares of the good land and 200 hectares of the bad for crop A. Shown in Table 4, this plan, with the same output of crop B and the same total labor inputs, provides for an increase of 150 centners in the output of crop A.

With labor input of 3,000 days we obtain 750 centners of crop B and 3,000 centners of crop A. How is the labor input to be divided between the two crops? Let us do this for each crop separately.

The labor input per centner of crop B is 500:750 = 0.67 days.

Similarly, the labor input per centner of crop A is 2,500:3,000 = 0.83 days.

These figures, however, cannot be taken as aggregate labor inputs because the labor input for crop B, which in all cases (both on the good and the bad land) requires a greater input of labor time, is smaller than for crop A — 0.67 as against 0.83 days. This result can only mislead us in deciding the question of the production and utilization of the crops. The correct way to distribute the labor input may be found by the method described above.

Suppose labor resources are increased by 1%, or by 30 days. Since the average conditions of labor must not change, this means that the good land has increased by 1 hectare

Table 2
Land, Yields, Labor Input

Land	Area (hectares)	Crop A		Crop B	
		Yield (centners per hectare)	Labor input (days per hectare)	Yield (centners per hectare)	Labor input (days per hectare)
Good	100	20	10	15	10
Bad	200 or more	10	10	6	10

Table 3
Initial Sowing Plan

Land	Crop A			Crop B		
	Area (hectares)	Output (centners)	Labor input (days)	Area (hectares)	Output (centners)	Labor input (days)
Good	80	1,600	800	20	300	200
Bad	125	1,250	1,250	75	450	750
Total		2,850	2,050		750	950

Table 4
Improved Sowing Plan

Land	Crop A			Crop B		
	Area (hectares)	Output (centners)	Labor input (days)	Area (hectares)	Output (centners)	Labor input (days)
Good	50	1,000	500	50	750	500
Bad	200	2,000	2,000	—	—	—
Total		3,000	2,500		750	500

(the resources of the bad land are assumed to be unlimited). With the increased labor resources we can cultivate an additional hectare of the good land and 2 hectares of the bad. This will yield 20 x 1 + 10 x 2 = 40 centners of crop A. Hence, the aggregate labor inputs per centner of this crop are 30:40 = 0.75 days.

By the same procedure we find the increase in the output of crop B is 15 x 1 + 6 x 2 = 27 centners. This last figure cannot, however, be taken as a basis, because the assumed labor input is not the most rational one. Under the given conditions it is more rational to grow crop B on the good land. It is therefore correct to use the 2 hectares of bad land for crop A; this will release 1 hectare of the good land. Now, while the total output of crop A is unchanged, the 2 hectares of good land will yield 15 x 2 = 30 centners of crop B. Accordingly, the time required per centner of crop B is 30:30 = 1 day, which is the aggregate labor input per centner of crop B. The revised plan, compared with the one given in Table 4, is presented in Table 5.

Table 5

Revised Sowing Plan

		Crop A				Crop B			
Land	Total area (hectares)	Area (hectares)	Yield (centners per hectare)	Change in labor input (man-days)	Change in output (centners)	Area (hectares)	Yield (centner per hectare)	Increase in output (centners)	Increa in labo input (man-da
Good	101	49	20	-10	-20	52	15	30	20
Bad	202 or more	202	10	+20	+20	—	6	—	—
Total	303			+10	0			30	+20

From these aggregate labor inputs (1 day for crop B and 0.75 days for crop A) it is easy to derive coefficients for converting the individual labor inputs to average inputs for the given aggregate.

The conversion coefficient both for crop A and crop B on the good land is the same: 1.5. And that is only natural because the conditions of labor in both cases are the same. Thus, these coefficients are determined by the conditions of the labor input. This, however, is true only under a rational plan and does not hold when resources are used irrationally. Thus, if crop B is grown on bad land (which in this case is irrational), the estimated output, with 10 days' labor input per hectare, would be 6 x 1.0 = 6 and the conversion coefficient would be 0.6 instead of 0.75 (the corresponding fi
are given in brackets in Table 6).

Example 3. A shop which manufactures articles A a
in equal quantities employs 40 workers, 10 of whom op
highly efficient automatic machines and 30, ordinary (u
versal) ones. The number of the latter machines is un
ited. An automatic machine turns out 3 articles a day
each kind, and a universal machine, one article. Unde
these conditions the shop can produce 30 units of artic
and 30 units of article B. The work is so distributed th
article A is produced on the automatic machines and a
B on the universal ones.

Empirically it appears that since article A is produc
the automatic machines its production requires 1/3 of
shift, while article B, which is produced on a universal
chine, takes 1 man-shift. It is quite obvious that this i
random result. For if the work were distributed differ
(if article A were produced on the ordinary machines a
article B on the automatic ones, which in this case is l
wise quite rational), the production time of article B w
be 1/3 of a man-shift, i.e., the ratio would change by a
factor of 9. If, considering that each of the two article
quires the same amount of labor, they were combined,
would obtain 60 units in 40 man-shifts, and the time re
quired for the production of each would be — 40:60 = 2
a man-shift. This is again a different solution, and a c
rect one. It shows how sharply the magnitude of the la
input may change if it is calculated incorrectly, empir

Let us calculate the aggregate input by the above me
Suppose the labor resources have increased by 10%, i.
4 days; the favorable conditions have improved simila
i.e., one automatic machine has been added. Then, wit

Table 6

Output in Average Labor Inputs

		Estimation of average labor input (days)			
Land	Yield (centners per hectare)	per centner of output	per hectare	output per hectare	Coefficient of conversion of individual to average labor inputs
Crop A					
Good	20	0.75	10	15	1.5
Bad	10			7.5	0.75
Crop B					
Good	15	1.0	10	15	1.5
Bad	(6)			(6)	(0.6)

Table 7
Two Articles Output Plan

		Article A				Article B			
ıchines	Number of machines	Output capacity of one machine (articles per shift)	Number of machines assigned	Output (number of articles)	Labor input (man-shifts)	Output capacity of one machine (articles per shift)	Number of machines assigned	Output (number of articles)	Labor input (man-shifts)
tomatic	10	3	10	30	10	3	—	—	—
iversal	30 or more	1	—	—	—	1	30	30	30
tal	—	—	10	30	10	—	30	30	30

universal and one automatic machines we can pro- 6 units of article A in one day; and the aggregate input per one unit of article A would be 4:6 = 2/3 of a The same is true for Article B. Thus, the conversion icients will be 2:3 = 0.67 for work on a universal ma- , and 2 on an automatic one.

t us note the properties of the output estimates in s of aggregate inputs and the possible applications of estimates, which confirm the correctness and useful- of the above method of computation. These estimates oncrete and dynamic. Designed for definite condi- , their absolute and relative values change with changes ese conditions (output norms, resources, production ods which determine the productive power of labor). changes in the estimates may be occasioned by, g other things, a change in the planned composition of t.

ample 4. Suppose that on the land in example 2 the tar- or crop B is not 750 centners, but 1,800 centners. Then e good land sown to this crop would yield only 1,500 ners, with the other 300 centners obtained from 50 hec- of the bad land (6 x 50 = 300). The remaining 150 hec- of the bad land would yield 10 x 150 = 1,500 centners of A.

ing the above method let us find the aggregate inputs. crop B (with labor resources increased by 30 man- and the area of good land by 1 hectare) the output is +2 x 6 = 27 centners, and the aggregate input per ner is 30:27 = 1.11 days. For crop A (with 2.5 hectares d land made available by planting 1 hectare of good land op B, and an additional 2 hectares of bad land, which s a total of 4.5 hectares) the output is 10 x 4.5 = 45 ners, and the aggregate input per centner is 30:45 = 0.67

us, the aggregate labor input for crop B has increased in absolute and relative terms as compared with the esponding labor input for crop A. This is only natural: nlarged target for crop B requires the use of bad land hich the conditions are less favorable not only in ab- e but also in relative terms.

th small changes in these conditions, the absolute s of the estimates in terms of aggregate inputs, and relationships, alter insignificantly: these estimates ather stable.

nally, a highly important property of the above estimates e realistic nature of the relationships determined by . Exclusion of a certain number of units of one com- ty from the plan releases a certain amount of labor as determined by these estimates. With this labor other goods can be produced in quantities which are likewise computed by means of estimates in terms of aggregate inputs.

Example 5. Let us go back to example 2, where the inputs for crop B and A were estimated as 1 day and 0.75 of a day, a ratio of 4:3. Indeed, in the plan we can replace, say, 30 centners of crop B by 40 centners of crop A (or vice versa). It is sufficient to take 2 hectares of the good land from crop B for crop A to obtain the following results: the output of crop B will drop by 15 x 2 = 30 centners, while that of crop A will increase by 20 x 2 = 40 centners.

Output estimates in terms of aggregate inputs can be applied to labor allocation and employment problems requiring economic calculations (alteration of the production program, replacement of one commodity by another, comparison of different production methods, etc.). In these cases the realistic nature of such estimates makes it possible to use them as coefficients for converting individual to average labor inputs. Now, if the changes are small in relation to the overall plan, the stability of the estimates means we can ignore those changes in the ratios of the estimates which are occasioned by the changes in the plan. If, on the other hand, the changes are substantial, the computation should be based on estimates corresponding to the new conditions.

Output estimates in terms of aggregate labor inputs are determined for specific cases. They can be directly applied for purposes of current planning in solving problems connected with the use of available production facilities. For problems covering long periods of time, particularly the problem of expanding production facilities, estimates for the given point of time cannot be used; however, account should be taken of their dynamics.

Let us examine some examples involving the use of output estimates in terms of aggregate labor inputs for various calculations.

Example 6 (revision of program). In example 2, the initial program (3,000 centners of crop A and 750 centners of crop B) is changed to 2,200 centners of crop A and 1,200 centners of crop B. Is this program feasible with the given labor resources? The initial program required 3,000 man-days of average labor. The new program, by the previous estimates, needs 2,200 x 0.75 + 1,200 x 1 = 2,850 man-days, i.e., the program can be overfulfilled by approximately 5%. Indeed, by planting crop B on 84 hectares of good land and crop A on 16 hectares of good land and 200 hectares of bad land we obtain 1,260 centners of crop B and 2,320 centners of crop A.

Example 7 (consumption). A certain quantity of the product has to be allocated for livestock fodder. Which crop should be used if crop B is 20% more effective as a fodder than crop A (10 centners of crop B being equivalent to 12 centners of crop A)? Estimated in terms of average labor input, 10 centners of crop B require 10 x 1 = 10 days, and 12 centners of crop A require 12 x 0.75 = 9 days. Thus, in this example crop B should not be used for fodder.

Example 8 (choosing a method to produce new goods). With the available facilities in example 3, it is necessary to produce another article, C. To do so we exclude 12 units of article B from the daily output plan. Article C requires 2 machine shifts' time per unit if worked on the universal machines, and 0.5 of a shift on the automatic ones. The problem is to determine (1) on which machines it is best to produce article C, (2) how much labor input does it require, and (3) what quantity of article C can be included in the plan.

Using the conversion coefficients derived earlier (in example 3), which equalled 2 for work on the automatic machines and 2/3 for the universal ones, we derive the input per unit. On an automatic machine it is 0.5 x 2 = 1 day of average labor input, and on a universal machine, 2 x 2/3 = 4/3 days. The correct method is to produce article C on the automatic machines. This also determines the magnitude of the aggregate input (1 day). By excluding 12 units of article B from the plan we release 12 x 2/3 = 8 days of average labor input. Hence, 8 units of article C can be included in the plan.

Can these questions be answered by determining the labor input empirically?

The first question — on which machines is it best to produce article C — cannot very well be answered: from the point of view of time input considerations it is best to use the automatic machines, but these are all occupied in the production of article A.

Regarding the second question, we know that a unit of article C requires 2 machine shifts' time on the universal machines and 0.5 of a shift on the automatic ones. But since it has not been decided which machines to use, the rational labor input cannot be established.

Now the third question. The standard time for 12 units of article B is 12 days. Taking the first empirically computed magnitude of labor input for article C, we find that 24 units of it can be included in the plan, while the second magnitude yields only 6 units. Thus, we get no answer at all to the first question, and to the other two we get two answers for each, and both wrong. Consequently, computation of labor inputs according to the actual average inputs may yield figures which are unsuitable for economic calculations.

Output estimates, in terms of aggregate labor inputs, which are used to choose optimum production methods are tools for drawing up an optimum plan. Hence, output estimates derived by analyzing a rational production plan, conforming to the given conditions, themselves become instruments for further improving, detailing and adjusting the plan.

The above method of computing aggregate labor inputs and converting individual to average labor inputs can be effectively applied under specific, more or less constant, production conditions. It becomes intricate and inconvenient when the labor conditions and the general facilities which raise the productive power of labor change. Then we need a more detailed analysis and quantitative examination of individual factors which determine the conditions of labor and affect the magnitude of the aggregate inputs.

***

Let us examine the question of estimating the effectiveness of the factors which increase the productive power of labor (the second method of computing aggregate inputs). In practice, to select production methods and to decide how to use the output, it is necessary to consider, besides direct labor inputs, the availability and possibility of using those factors which affect the productive power of labor, such as transport facilities, complex equipment, capital investment
resources, etc. Not infrequently a method requiring sn
inputs has to be rejected in order not to increase trans
operations, to avoid the use of scarce equipment, and s
In production it is often necessary to use raw or other
rials which, though costlier than the regular materials
not require scarce production facilities. An objective c
titative evaluation of these factors can be made by stud
the conditions which determine aggregate inputs.

In evaluating a factor which increases the productive
power of labor, it is necessary to proceed from the spe
situation and a rational plan.

The use of scarce raw materials or equipment for th
production of a given article indirectly increases labor
puts in other sectors of the economy, since the use of t
materials and machines in the given production dimini
the possibility of their use in other production.

For a quantitative measurement of indirect inputs, i
necessary to calculate the amount of labor which can b
saved by each unit of the scarce equipment and materi
or by the application of any other factor which increas
the productive power of labor. In this manner we deter
mine the labor estimates of the effectiveness of these
facilities in the given situation. By comparing the tota
estimate of these factors, derived in this manner, with
the available labor resources, we obtain a normal rela
tionship between labor and the conditions in which it is
performed, a relationship corresponding to the averag
favorable conditions of labor in the given situation. Th
ratio of labor inputs to the estimate of the applied fact
which increase the productive power of labor enables u
judge also whether the given specific process is provi
with favorable conditions and factors; it enables us to
press quantitatively the deviation of the concrete condi
tions from the average conditions of labor.

Thus, estimation of the effectiveness of the element
which bear on the productive power of labor makes it
ble to convert the concrete labor conditions to average
terms. Hence, it is an instrument for computing aggre
inputs. And this is what the second computing procedu
based on.

Let us denote the full labor resources by L, and the
estimate of the factors by F. Then the normal ratio ch
acterizing average labor will be (L+F): L.

In a particular production process where the labor i
is l and the estimate of the factors is f, this ratio (l+f)
may be different. Consequently, to express the labor i
in this process in terms of average labor, we must mu
ply them by the coefficient:

$$\frac{l+f}{L} : \frac{L+F}{L} = \frac{L}{L+F} : \frac{l+f}{l}$$

Multiplying the labor inputs l by this converstion co
ficient, we get:

$$\frac{L}{L+F}\,(l+f) = cl+cf,$$

where for brevity we have introduced the notation

$$\frac{L}{L+F} = c.$$

In a specific case when scarce materials, equipmen
etc. are not employed in the given labor process, i.e.,
f = 0 (let us call such labor unequipped labor), this la
is reduced to average terms by multiplying it by c. If
multiply by c the initial estimates of the factors (expr

ms of unequipped labor) and take $f_1 = cf$, i.e., express in terms of average labor, the aggregate labor inputs given process may be presented as $cl + cf = l_1 + f_1$. , they are composed of direct labor inputs reduced to of average labor, and indirect inputs, i.e., the inputs tors which help to raise the productivity of labor, like-xpressed in terms of average labor. Let us illustrate y an example.

mple 9. Take the conditions of example 2. The scarce ction factor here is the good land. How effective is it? h hectare of good land replaces 2 hectares of bad land, y using the good land we get the same output without ating 1 hectare, thus saving 10 man-days of labor. constitutes the effectiveness of this element.

total labor resources in this example are L = 3,000 lays; the favorable factor (100 hectares of good land) imated at F = 100 x 10 = 1,000 days, i.e., the normal is (3,000 + 1,000):3,000. The share of direct (visible) is c = 3,000:4,000 = 0.75. This figure is the coefficient nverting unequipped labor into terms of average labor given conditions; specifically, it is the coefficient for rting labor inputs on the bad land into average labor .

s conversion coefficient should also be applied in ating favorable factors for labor. Thus, the estimate use) of one hectare of good land expressed in terms rage labor is 10 x 0.75 = 7.5 days. It should be used timating labor inputs in other cases as well.

aggregate labor inputs for each type of output are ited in Table 8, and the results do not differ from those ed by the first method.

Table 8
putation of Aggregate Labor Inputs (second method)

d	Average labor input per hectare (days)			Output (centners)	Labor-time per centner
	Visible	Indirect	Total		
A					
d	7.5	—	7.5	10	0.75
l	7.5	7.5	15	20	0.75
B					
d	7.5	7.5	15	15	1.0

mple 10 (See example 3). On an automatic machine an does the work of three (3 units of B instead of 1). fore an automatic machine saves 2 machine-shifts of ipped) labor per shift. Consequently, the per-day iveness of an automatic machine is estimated at 2 ne-shifts of unequipped labor. The total resources stimated at 40 + (10 x 2) = 60 shifts, and the share of labor input at 2/3 of a day. Accordingly, the labor hift) should be reckoned with the coefficient 2/3, will show that the machine's effectiveness during a quals 2 x 2/3 = 4/3 of a day of average labor. Thus t the same magnitude of aggregate input as before. unit of article A, for example, it is 1/3 x 2/3 + 1/3 x 2/3 of a day.

inclusion of indirect inputs in the output estimate mined by aggregate inputs denotes that the use of e equipment is paid for, so to speak, in a way similar it occurs when equipment is hired (rented) for temporary use. In this example the "hire estimate" for an automatic machine is 4/3 of a day of average labor (for one day's use of it).

Separate accounting of direct and indirect labor inputs makes it possible to determine the aggregate inputs by a straight calculation of the elements of these inputs in the given specific production process. By expressing unequipped labor and the effectiveness of the factors which increase its productivity in terms of average labor, for each concrete job, we can calculate the labor inputs on the basis of these estimates without each time analyzing the distribution of labor in society (or the given industry) as a whole. This is where this method is superior to the first one, and this is manifested particularly in applying aggregate input calculations to such economic operations as revision of production programs, rational utilization of output, estimation and comparison of production methods. It will be further noted that if for the given output it is rational to employ several production methods, the total labor inputs (direct plus indirect) per unit of output should, in each of these methods, be the same and equal to the aggregate inputs. Like the output estimates, the estimates of the effectiveness of production factors in terms of labor are concrete, stable and realistic.

Here are a few examples of applying estimates of the effectiveness of production factors in economic calculations.

Example 11 (Simultaneous change of output program and resources). Suppose that in example 2 the labor resources have been increased by 600 days and 10 more hectares of good land have been allocated. How much can the target for crop B be increased with the target for crop A remaining unchanged?

The increase in the labor resources, converted into terms of average labor, can be expressed (using the estimates derived in example 9) by 600 x 0.75 + 10 x 7.5 = 525 days of average labor.

One centner of crop B requires an input of 1 day of average labor. Hence, the target can be increased by 525:1 = 525 centners of crop B.

Example 12 (estimation of feasibility of a new production method). By better cultivation with an input of 13 days instead of 10 on a hectare of land, the output of crop B (on the good land) can be increased by 20%. Is this worth while?

Converted into average labor, the 3-day increase of labor input, without the use of additional production factors, will comprise 3 x 0.75 = 2.25 days, and the 20% increase in output will equal 15 x 0.2 = 3 centners, which corresponds to 3 x 1 = 3 days of average labor. Consequently, under the given conditions it is worth while to use the more laborious method as it, in the final count, saves labor.

Example 13. Under the same conditions as in example 2 it is necessary to assign some land for crop C with a target of 600 centners. Cultivation of one hectare requires 4 days; the bad land yields 20 centners and the good 60 centners per hectare. What land would it be best to use for this crop? Let us calculate the total inputs required for its production, using in both cases the estimates of example 9. These inputs will be:

On the bad land:

4 x 0.75 = 3 days per hectare
3:20 = 0.15 days per centner.

On the good land:

4 x 0.75 + 7.5 = 10.5 days per hectare
10.5:60 = 0.175 days per centner.

It is clear from the above that it is best to use the bad land for crop C. This conclusion could have been reached only by examining the aggregate labor inputs, and not only the direct ones. Otherwise it might have seemed better to use the good land for this crop, as on the good land its output would be three times as high as on the bad land, the output of crop A being, respectively, only twice as high.

In estimating a new production method (example 12) we have found it expedient to cultivate the land more intensively in order to get a higher yield. If, however, we were to judge by the visible labor inputs, their increase by 30% would increase output only by 20%. As input per unit of output rises and labor productivity declines, this method, it seems, should not be used. Thus, we see that calculation in terms of direct labor inputs can be misleading with regard to the proper use of production factors.

It should be noted that effectiveness estimates can be applied not only to individual types of equipment but also to whole enterprises. For example, when power resources are strained the production factor of drawing on the central power supply should apparently be highly favored. This would lead to equalizing aggregate inputs at central heat and power plants and factory power stations, if it is rational to use the latter. This would confirm, for instance, the economic feasibility of intensively using the central heat and power plant in the given conditions, even if it would require a somewhat higher input of fuel per unit of electric power output.

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The foregoing shows that to calculate aggregate labor inputs it is necessary in each case to consider indirect as well as direct labor inputs. Only by adding indirect labor inputs to the direct ones is it possible to convert concrete individual labor inputs into uniform standards and thus derive the aggregate labor inputs for the given output.

Consideration of indirect inputs makes it possible to decide correctly the question of using favorable natural conditions (good land in our examples). The proposed method eliminates the possibility of accidental, incomplete use of these conditions (see examples 12 and 13). Besides more fertile land, such conditions may be: water for irrigation, forests, fishing ground, rich oil fields, mineral deposits, etc.

Output estimates which take account of indirect inputs, particularly the inclusion of rent in regard to production under limited favorable physical conditions, facilitate the proper allocations of scarce commodities, their economy, and substitution by other commodities. Under socialism rent must certainly be considered in planning. The amount of rent must be such as to ensure the most rational use of natural resources. Some idea of how to compute rent has been given above.

***

The present article aims at calling attention to some methodological aspects of reckoning and computing aggregate inputs at enterprises. The modern system of indices applied in planning and accounting reflects differences
the conditions of labor only with regard to the skill of t
worker and the intensity of his labor, which is expresse
the level of wages and, consequently, in production cost
Differences in such important conditions of labor as na
factors and availability of equipment are not considered
quantitatively and are not reflected in cost calculations

By simple examples we have tried to present the pri
ciples of reckoning all the basic conditions of productio
computing aggregate labor-time inputs. We have exami
ways of determining aggregate labor inputs only as app
to individual enterprises. Our computations have been
directly in units of labor time, but they can also be ma
money (value) terms. The calculation procedures pres
in this article can, we believe, be combined with statist
material characterizing the economic data and interrel
tionships between enterprises and industries in the nati
economy, and can be used for elaborating methods of d
termining optimum variants for applying various possi
production methods and for computing input-output rela
ships on the scale of a whole industry and for the entir
national economy.

NOTES

(1) Karl Marx, Capital, Moscow, 1954, Vol. 1, p. 40
(English edition).

(2) Ibid., p. 39.

(3) Translators note: kompleksnymi

(4) By direct inputs we mean inputs not only for the
duction of the given output, but also for the raw materi
tools and equipment per unit of the output. It will be no
also that throughout this article labor is regarded as s
ple, unskilled labor (or generally labor of one kind); co
plex labor is assumed to be reduced to simple labor. V
are not concerned here with the reduction mechanism.

(5) The simplest examples are given here, so as not
distract the reader's attention with complicating detail
from some fundamental propositions which these exam
may suggest. The methods set forth below, however, c
be applied to analyzing much more complex cases. A c
prehensive exposition of methods for deriving optimum
plans and their indices in more complex situations (wit
many kinds of output, a large number of production sec
and various complicating and limiting conditions) is co
tained in L. V. Kantorovich's Matematicheskie metody
ganizatsii i planirovaniia proizvodstva (Leningrad Univ
sity Press, 1939); L. V. Kantorovich's and V. A. Zalga
Raschet ratsional'nogo raskroia promyshlennykh mate
(Leningrad Publishing House, 1951); L. V. Kantorovich
Ekonomicheskii raschet nailuchego ispolzovaniia resu
(USSR Academy of Sciences Publishing House, 1959).
Abroad, the technique of solving such problems, being
elaborated there since 1948, is known as linear progra
ming.

Nauchnye Doklady Vysshei Shkoly, Ekonomicheskie Nauki-
No. 4, 1959

Kozlov:

ne Theoretical Problems of National Economic Effectiveness Utilization of Machines

e 21st Congress of the CPSU noted that the most im- nt measures for the further growth of production and eductions in production costs are the all-round mech- tion and automation of production processes. The in- ction of new technology into our industry is being ded for by vast sums of capital investments, as en- ed by the Seven-Year Plan for the development of the nal economy. However, the rates of the expanded re- ction depend not only upon the volume of appropria- set aside for capital investment, but, to a greater de- upon the effectiveness with which they are employed. s connection, the problem of the effectiveness of utili- n of machines takes on special significance.

the June Plenum of the Central Committee of the CPSU , much attention was given to the problems of the ef- eness of the new technology. In order to assure the ct execution of measures for all-round mechanization utomation in the various branches of the national econ- and the concentration of national efforts and material rces in the most important areas, the Plenum in- ted the appropriate agencies to elaborate, in 1959, a d of determining the economic effectiveness of the in- ction of mechanization and automation of production, lue consideration for the specific features of the vari- ranches of industry. This decision once again empha- the urgency of working out theoretical problems con- d with the determination of the effectiveness of intro- g new technology.

e problem of the effectiveness of mechanization is one s also faced by capitalist enterprises. However, the tion of the law of surplus value under capitalism de- nes the narrowness of the criterion of the effective- of mechanization. In capitalist society there is no na- economic approach to the determination of the suita- of employing machinery. Here, the criterion of ef- eness of mechanization is the possibility of increasing rofit earned by individual capitalists. In this situation, ofitability of employing machines depends upon busi- conditions.

ontrast to this situation, the basic economic law of so- m guarantees a national economic approach to the de- nation of the criterion of effectiveness of mechaniza- hich will depend not upon the business situation at a moment, but upon the perspectives for the further mic development of the country. Karl Marx pointed to istence of two approaches to determining the limits of onomic desirability of using machines, one for the list and one for the national economy as a whole. For alist economy, it is the national economic approach becomes typical in the solution of problems of effec- ss of mechanization.

national economic effectiveness of mechanization of ction lies in the fact that the saving in living and con- ed labor resulting from the utilization of machines ds the labor expended upon their production. If this condition is not met, the use of machines exceeds the limits of economic desirability for the national economy. This internal relationship among economic phenomena was termed an absolute law by Karl Marx. (1)

The mechanization of production within the limits of economic desirability of utilization of machines signifies an economy of the labor of society, and an increase in its productivity.

Machines are a product of heavy industry. However, one cannot judge the profitability of the production of machines only on the basis of indices of the productive activity of the machine-building and other branches of industry participating in their creation. The expenditures of labor upon the manufacture of machines must be compared with the economic results of their utilization in various branches of the national economy. Moreover, the expenditures of labor upon the production of machines are only gradually made good by the savings of labor in the branches where these machines are employed. Complete reimbursement of the labor expended requires a specific period of time, after which society begins to experience a real gain from the employment of these machines. This does not at all mean that branches of heavy industry are unprofitable in the early period. The concept of national economic profitability cannot be examined from the viewpoint of some single moment. Branches of heavy industry create, from their moment of founding, the national base for savings of social labor in the further course of production.

The production of the means of mechanization of labor, and the technological re-equipment of the industrial base of the country over a period of time, make it possible to liberate and bring into action enormous internal resources for expanded reproduction, thanks to the growth of productive forces and the consequent increase in the economic potential of the country. This is expressed in the fact that the labor expended upon the production of machines is later more than sufficiently recouped by a considerably greater saving of social labor. Thanks to the utilization, by society, of the internal labor resources thus liberated, the physical volume of production multiplies many times. Thus, the economic effectiveness of mechanization consists in the saving of social labor and the improvement in the conditions thereof.

The saving of time, as the primary economic effect of the introduction of machines, and the other benefits to the economy, which constitute the secondary results of the mechanization of production, cannot be viewed as phenomena of the same order. The saving of time is the common source of all other economic and social benefits. The other effects of mechanization include the increase in the volume of production, the expansion of the variety of products produced, etc. These secondary economic results also include the production by machine techniques of items which simply can not be made by hand.

The improvements in the conditions of labor as an independent goal of the introduction of machines is possible only under socialism. However, under socialism, too, it is impossible to permit the mass introduction of machinery only for this purpose, regardless of its economic effect in value terms. If machines do not save labor for society in the long run, their production is economically unjustified for society.

The magnitude of the saving of labor obtained (the degree of effectiveness or the national economic profitability of the use of machines) is of prime significance for the rates of increase in production. Analysis of the economic effectiveness of the employment of machinery and of capital investments as a whole constitutes one of the most important tools of economic policy, making it possible to determine, with a full knowledge of what one is doing, the necessary direction and proportions in the development of heavy industry, and also to correctly undertake the most rational technological re-equipment of each branch of the national economy.

An immediate indicator of the saving of living labor in a particular sector is the increase in labor productivity in the given branch of industry. Of greatest significance not only for the branch under examination, but for the entire national economy, is the increase in labor productivity in branches of industry requiring a great deal of labor. This is explained by the fact that enormous resources for the liberation of labor power for newly developed enterprises are concealed herein. And the more rapid is the influx of labor power to new construction sites, the higher are the rates of socialist expanded reproduction. It was not by accident that V. I. Lenin emphasized that the chief guarantee of the ultimate triumph of the new social order is the attainment of a higher level of labor productivity than that attained by the old methods of production. What is meant here is not so much the productivity of labor in a given branch of the economy, but in the economy as a whole.

An increase in the productivity of social labor presumes a significant increase in the productivity of labor at the enterprises of those branches in which the mechanization of production is being carried out. If the productivity of labor does not increase adequately in a given branch of industry, the productivity of the labor of society may also not only fail to increase but actually drop. Such a situation will arise when the saving of living labor in the branch of industry employing the new technology proves to be so insignificant that it does not cover the increasing expenditures of past labor connected with the employment of machinery. This phenomenon would be a serious brake upon the development of the entire national economy and would slow down the rates of expanded reproduction.

The best synthetic indicator accurately descriptive of the national economic effectiveness of the introduction of machinery is the dynamics of the value of commodities produced with the aid of this machinery, reflecting the dynamics of the socially necessary labor embodied in the commodities. Mechanization is effective for the national economy if a reduction in the value of a unit of output is observed as a result of its application.

Karl Marx emphasized that:

> ... in order for a new method of production to justify itself by a real rise in productivity, it must ... reduce the value of the commodity. It goes without saying that it must bring its influence to bear in this manner even if, as will occur from time to time, the formation of the value of a commodity includes not only the newly worn out portion of the fixed capital, but an additional portion of value representing types of raw materials and auxiliary materials that are greater in quantity than before or more expensive. All additions to value must be more than balanced by a reduction in value due to a reducti in living labor. (2)

When machines are employed effectively, there may b an increase in the relative share of past labor (old, or transferred value), but this increase is such that the va of the commodity as a whole diminishes along with a co siderable reduction in the relative share of living labor (newly created value) in the total value of the commodit Moreover, the absolute magnitude of old value may eith increase or diminish depending upon the stage of mecha zation. As one proceeds from manual labor to machine bor, it usually rises, but the later course of mechanizat involves a gradual diminution, although it may fluctuate from time to time. The change in the absolute magnitu of both components of the value of a commodity, depend on the degree of mechanization of the production proce may be depicted in the figure which follows (see Figure

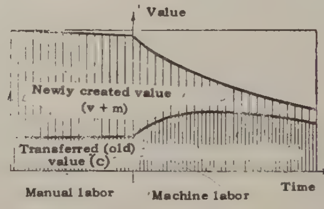

Figure 1

When the transferred value becomes relatively large further reduction in the total value is possible, as a rul under conditions of what is termed the absolute effectiv ness of employment of machinery, that is, under condit of absolute reduction of both parts of the value of a unit output. Today, this condition pertains primarily to situ tions of all-out mechanization, and particularly to the a mation of production. Inexhaustible reserves for the achievement of absolute effectiveness of capital investn may be found not only in the employment of machines, in the utilization of new chemical, electronic, nuclear, other processes, which are all coming increasingly und the control of man's scientific will.

However, under circumstances of what is termed the relative effectiveness of employment of machines, whe transferred value per unit of product increases in abso magnitude, an inadequate increase in the productivity o bor in the individual branch of industry may lead to a r duction in the productivity of social labor. Let us assu that at two analogous enterprises (see Figure 2), the tr ferred (old) value per unit of product doubles. The eff tiveness of employment of the new equipment at these prises differs. At the first enterprise, there is a 37.5 duction in the newly created value per unit of output, a this corresponds to a 60% rise in the productivity of li labor. However, at the second enterprise, the newly c ated value was reduced by only 12.5% (the increase in

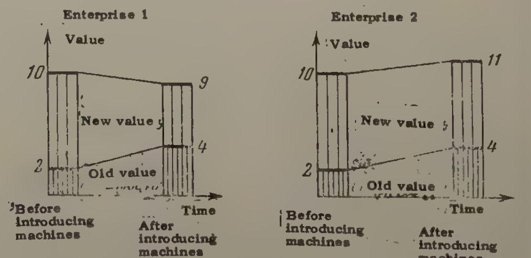

Figure 2

ıctivity of living labor, correspondingly, being 14.3%). result, at the second enterprise, despite the 14.3% inse in labor productivity, the utilization of machinery esulted in a drop in the productivity of the total social , expressed in a 10% increase in the value of a unit of ıct. The mechanization of production at the second enise proved to be ineffective from the viewpoint of the national economy. This situation was not uncommon, for example, in the first stage of mechanization of the logging industry.

In the economic council of the Estonian SSR, the dynamics of expenditures under comparable conditions and unchanging prices per one thousand cubic meters logged may be described by the following data:

Table 1

Ruble Expenditures per 1000 cu. m. of Logged Lumber Under Comparable Production Conditions (in 1955 prices)*

	1947	1950	1955	1957
Living labor for oneself (v)	55,800	54,400	43,500	37,400
Past labor in form of machine-shifts worked	5,570	6,500	12,780	16,510
Past labor in form of horse-days worked	11,800	14,200	3,270	2,700
Past labor in form of amortization of other fixed capital	110	260	620	960
Other expenditures for past labor (penalty payments, etc.)	12,000	12,000	12,000	12,000
Total past labor (c)	29,480	32,960	28,670	32,170
Grand total	85,280	87,360	72,170	69,570

* Author's calculation based on annual reports of Ministry of Lumbering Industry and Logging Operations of the Estonian SSR. Also see Sbornik nauchnykh trudov Estonskoi Sel'skokhoziaistvennoi akademii, No. 7, Tartu, 1958.

ure 3 depicts this same dynamic of production expenes per unit of output under comparable conditions. is evident from the data adduced, a saving of social of more than 18% was achieved as a result of mechtion in the ten years starting in 1948, with respect to ıction expenditures subject to monetary calculation. gnificant increase in the expenditures of past labor bserved during these ten years, as the increase in extures for mechanical implements of labor was compen for almost completely by a reduction in expenditures ie other component of past labor — horse transport icularly in the period prior to 1955). However, during rst stage of mechanization, a reduction in the produc of social labor was observed, accompanied by a negli increase in the productivity of living labor in the given h of industry.

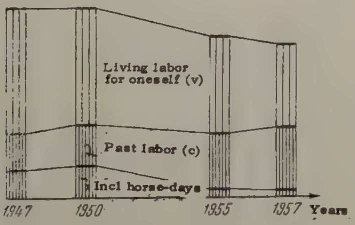

Figure 3

practical determination of the degree of effectiveof mechanization is an exceptionally difficult problem. hief difficulty lies in the absence of data on the actual of each commodity. As we know, prices deviate from for various reasons. However, efforts to determine agnitude by which prices deviate from the values of various commodities, as undertaken by some economists, have thus far not yielded sufficiently accurate results.

The methods of determining the effectiveness of capital investments or mechanization, suggested by various writers, may be divided into two major groups:

(a) methods applied chiefly in planning practice, particularly in the comparison of different planning variants, and proceeding from an analysis of standards. This group includes, for example, the temporary typical method recommended by the Gosteknika of the USSR;

(b) methods whose purpose it is to solve not primarily current specific planning problems, as much as problems involved in determining long range trends, and the general direction of the further development of socialist reproduction, and based upon statistical analysis.

In all the methods applied in planning practice hitherto, inadequate attention has been paid to one very important index — the time factor, which is sometimes completely ignored in determining the effectiveness of capital investments. This practice was sharply condemned by the 21st Congress of the CPSU. The effectiveness of capital investments largely depends upon the time required to get them into complete normal working order. The shorter the period between the first investment and the time by which the item is in full operation, the higher the effectiveness of the total investments in the final analysis.

Some economists are suggesting methods of determining the effectiveness of capital investments under which the reckoning of all expenditures of social labor, including past labor, is reduced to the direct expression thereof in working days or hours. A. D. Emel'ianov has suggested one such method. (3) However, the transition from expression of expenditures of past labor by means of an indirect value measure to direct expression in working days or hours is a problem of extraordinary complexity. The result is imprecise, as the working hour in one sphere of production is not equal to the working hour in another, as a result of the difference in the degree of skill and the intensity of labor involved.

The value form of reckoning production expenditures provides the basis for a statistical method of determining the effectiveness of capital investments, suggested by T. S. Khachaturov, (4) under which capital investments are compared with the net product resulting therefrom. This method is wholly applicable to analysis of the effectiveness of capital investments over a long period. However, under circumstances in which this period is comparatively brief, and the capital investments made during the period are great, T. S. Khachaturov's method yields imprecise results, because it is not possible to recoup all the capital investments during this period through the net product. T. S. Khachaturov's proposition to the effect that the fundamental qualitative criterion of the effectiveness of the capital investments is an acceleration in the rates of communist construction is indubitably correct.

However, for quantitative determination of the effectiveness of mechanization, the most flexible statistical method is that of comparing current expenditures per unit of product prior and subsequent to capital investments in mechanization. In this situation, what is understood by current productive expenditures is not the actual production cost, as fluctuations in wages are reflected therein, but the real social cost of production, that is, value. However, since data on the total magnitude of value are lacking, one must consider at least that portion of the expenditures which are expressed in comparable prices and subject to monetary expression. (5) In this type of comparison, capital investments are calculated only to the degree that the new fixed capital has been worn out, or in other words, through amortization. Therefore, the accuracy of the results of the analysis depends in the most direct fashion upon correct calculation of the degree of wear and tear of the means of mechanization.

The reduction in the value per unit of product as a result of capital investment (or of the cost of production expressed in comparable prices) constitutes a criterion on the basis of which one may draw the conclusion that capital investments are recouped prior to the expiration of the amortization period (assuming a proper amortization rate). This criterion, which does not reflect the degree of effectiveness of capital investments to the fullest, makes it possible to arrive at only a general picture of the effectiveness of mechanization.

The degree of effectiveness of capital investments can be determined by comparing them with the dynamics of value (or, correspondingly, with expenditures expressed in comparable prices). The major index in this situation will be the ratio of the additional capital investments per unit of product to the absolute reduction in its value, i.e., the recoupment period for the capital investments (in years).

This ratio may be expressed in the following formula:

$$T = \frac{\Delta k}{\Delta w}, \text{ or } T = \frac{\Delta f}{\Delta w}, \text{ where}$$

T is the recoupment period for the added capital investments;

Δk represents the supplementary capital investments per unit of finished product;

Δf is the increase in productive capital per unit of product;

Δw is the reduction in the value per unit of product or in production expenditures expressed in comparable prices.

A magnitude representing the reciprocal of this indicator expresses the coefficient of effectiveness of capital inv ments.

The recoupment period index is not a new one. Howe it is usually calculated as the ratio of all supplementar capital investments (and not per unit of product) to the grand total of annual savings. The somewhat modified method suggested here is distinguished from this by its flexibility and therefore makes it possible with compar adaptability and satisfactory precision to determine the tional economic effectiveness of the employment of machines both in the branch of industry as a whole and in individual enterprise. It is most convenient for branch of the economy producing homogeneous types of produc In the interests of greater accuracy it is desirable to maximum use of indicators in kind (man-days, machine shifts, consumption of materials, etc.) with subsequent version to a common denominator in value form.

In the example presented above (see Table 1), the re tion in production costs over a ten-year period (in a co parable estimate) for a unit of product (1000 cu. m. of lu is expressed in the sum Δ w = 85,280 - 69,570 = 15,710 rubles. The increase in fixed capital engaged in indust production in this field per 1000 cu.m. of annual haulag wood comes to 48,450 rubles for this period. The reco ment period for the capital investments then is:

$$T = \frac{\Delta f}{\Delta w} = \frac{48,450}{15,710} = 3.1 \text{ years}$$

This recoupment period is not only less than the am zation period calculated on the basis of the physical we ing out of the fixed capital, but also less than the possi period of time before obsolescence occurs. The recou ment period derived in this manner diminishes with th crease in labor productivity if the volume of increased tal investments does not change. This signifies a mor fective utilization of the same means of mechanization sulting from increased skills of employed personnel.

In calculating the effectiveness factor for, let us say first, second, third, etc., years after introduction of th new equipment, we are thus in a position to establish t direct relationship between the increase in labor produ tivity and the increase in the coefficient of economic e fectiveness of new equipment.

In connection with the comparison of the expenditure past labor expressed in machine-shifts with the saving living labor, the question arises as to the proper reck of the expenditures of living labor involved in repair a servicing of equipment. These expenditures may be charged both to the expenditures of labor absorbed by machines (on a par with the labor expended in their pr tion), and directly to the expenditures of labor in the g branch of industry. However, as we see from Table 2 results will be identical in the two cases. (See Table which is shown on the following page.)

Unfortunately, the reports made by industrial enter do not individually identify labor expenditures on the r pair and servicing of machines. They are, on the one included in the total volume of production expenditure labor at the given enterprise, and, on the other hand, fall into the compound headings of calculations of the duction costs of a machine-shift along with the expend of labor for the production of the machines, i.e., they up as social labor absorbed by the machines. Consequ ly, in analyzing these expenditures it is necessary to ceed either from the sum of the total labor expenditur the enterprise or from the production costs of machin shifts. Otherwise, there will be no comparability of l labor with the expenditures of labor absorbed by the

Table 2

Possible Variants of Comparison of Labor Expenditures in Production and Servicing of Machines With the Saving in Living Labor (in man-days)

Indices	Variant 1	Variant 2
1. Social labor absorbed by machines:		
(a) past labor expended upon production of machines;	1000	1000
(b) living labor expended upon repair and servicing of machines at given enterprise	500	—
Total:	1500	1000
2. Living labor freed by machines:		
(a) employed in repairs at given enterprise;	500	—
(b) no longer needed at given enterprise	1200	1200
Total:	1700	1200
Saving of social labor	200	200

ines. It would be more desirable to eliminate them the production costs of the machine-shift, i.e., to con- he analysis on the basis of the second variant. This nt makes it possible to eliminate from the analysis fluous data not presently subject to complete account- value form because labor finds monetary expression n the form of wages, i.e., it is calculated without la- xpended for society. In calculating the dynamics of ditures per 1000 cu.m. of lumber in the example presented , it was the second variant that was used.

eoretically, a scientific determination of the effective- of mechanization should be performed on the basis of tal value. In this connection, an exceedingly important tive for the national economy is the maximum possible ximation between the prices of the means of produc- nd their value. Such prices would create objective tions for the most rigorous system of economy in the al economy, and would make it possible to avoid many ces of irrational utilization of material values. Not in- ently, violations of conditions of economy are due fically to an unjustified difference between price and , with the result that an appearance of profit is some- produced where actually society is suffering a loss. for example, prior to the increase of prices for lum- roducts in 1957, a false appearance of profitability was ed in construction organizations by using construction r as compared to reinforced concrete.

oceeding from the practical necessity for an approxi- n between the prices of means of production and their s, certain economists suggest that this problem be d by a price reform. However, the carrying out of a reform at one blow would be complicated in practice. ht break down certain relationships among different hes of the economy that have become firmly estab- . Moreover, the correspondence between prices and s as a result of such a reform would merely be tem- y, inasmuch as the value of commodities is constantly ing.

he same time, it would hardly be desirable to pre- the present system of pricing. It cannot be held, as n economists maintain, that as a result of an increase or productivity the value of the means of production will approximate their prices without changing the pricing system. The gradual approximation of prices to values by means of a flexible pricing system must be viewed as a pressing problem of economic policy at the present stage. "In the time that has elapsed since the 20th Congress of the party," said A. N. Kosygin in his speech at the 21st Congress of the CPSU, "the planned pricing system has undergone a further development: uniform prices for agricultural products purchased in the collective farms have been established, the rights of the republic and local agencies in price fixing have been extended, and other measures to adjust prices have been taken. It is necessary to conduct further work toward adjusting and eliminating incongruities in prices." (6)

In order to reveal the total value of all or of the bulk of commodities, it is necessary to have, in the first place, an elaboration and systematization of a considerable quantity of initial data. Also necessary is an enormous job of computation to study these data. It is inconceivable that this work can be done with the required flexibility without the assistance of modern computers. Obviously, it would be desirable to establish a special central agency for scientific statistical work in the field of value and labor accounting, which would assist the planning agencies in correct pricing, would regularly calculate the differences between current prices and values, and would disseminate scientific information in this field. Moreover, it would be able to elaborate a system of economic indicators for statistical reports by enterprises so that they will be able to serve as points of departure for the calculation of value.

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(Continued on Page 62)

Nauchnye Doklady Vysshei Shkoly, Ekonomicheskie Nauki
No. 4, 1959

G. Anisimov:

The Motive Forces of Technological Progress in the USSR at its Present Stage of Development

The June Plenary Session of the Central Committee of the CPSU, acting to carry out the historic decisions of the 21st Congress of the Communist Party, has elaborated the specific directions and forms to be taken in the further development of technical progress in the USSR. "Only through technological progress, based on the finest achievements of science and eingineering, and on the most advanced experience," Comrade N. S. Khrushchev emphasized at the June Plenary Session, "is it possible to guarantee a rapid and steady growth in labor productivity, and high rates of development of the national economy."

The data of the June Plenary Session of the Central Committee of the CPSU testify to the great significance of working out the problem of the motive forces in technological progress during the period of all-out development of a communist society.

The Concept of Technological Progress and Its Motive Forces Under Socialism

Technological progress has not only its specific characteristics, but a general content, the classification of which is an important prerequisite for a correct understanding of the motive forces of the growth of technology at various stages of historical development.

By technology is meant the system of implements of labor in social production. Inasmuch as people influence nature in the process of production, not individually, but collectively through the forces of society, technology, too, must be examined not from the point of view of the individual piece of equipment or a simple mathematical sum of implements, but as a system of interrelated tools of collective labor.

The definition of technology as a system of implements of social labor was first advanced by the founders of scientific communism, Karl Marx and Friedrich Engels, who not only provided an analysis of the forms of growing socialization of production during the machine age of capitalism, but also subjected the foundations of private capitalist property to scientific criticism. They found that the law of development of technology for large-scale production is a replacement of the system of tools used by manual labor by an intricate system of machines. "The tools specific to the various individual workers ... are now being converted into the tools of various working machines, of which," Karl Marx emphasizes, "each constitutes a particular organ carrying out a specific function in the system of the combined actuated mechanism." (1)

The view of technology as a system of interrelated implements employed by social labor made it possible to study the motive contradictions within the system of implements of labor, and to demonstrate their role in the development of the productive forces of society.

Changes in technology occur constantly. Having solved certain contradictions, technological progress gives rise to new contradictions, and calls ever newer technologic requirements into life. "Thus, for example, machine spinning created the need for machine weaving, and the together created the need for a mechanical and chemica revolution in the bleaching, printing and dyeing industri (2)

The composition and boundaries of the totality of the plements of the labor of society change with the develop ment of society. At the very outset of human history th implements of labor appear as products of social labor and their manufacture is the most important function of cial production.

The new implements emerging from the process of p duction as the result thereof represent the shifts occur in the social labor force, as a given totality of skills an working capacities at the disposal of society. The new quality of the labor force of society comes into being no only in the process of using new implements of labor, b first of all in those branches of industry from which the implements emerge as the result of production. Qualit tive changes in the labor force of society which occur i the process of creating new implements of labor are th points of departure in the development of the productiv forces.

Technological progress proceeds in two forms: on t one hand, it is the result of the production of new and t nologically more advanced implements of labor; on the er, it is the result of the improvement (modernization) the implements of labor which are already functioning sphere of productive consumption. Modernization is th means for a continuous advancement in the technologic level of production.

The rate of technological progress is dependent, to a considerable degree, upon the level of development of ductive forces which society has already achieved. In thi spect, the various components of the productive forces not play identical roles. The development of technolog determined not by the general level of development of productive forces, but primarily by the status and leve technology in the production of the implements of labo such, and insofar as personnel are concerned, primari by the level of skill of the portion thereof that is direc involved in the elaboration and development of new tec nology.

Technology develops within the framework of histori determined property in relationships in the means of p duction, and therefore each social and economic order its own economic forms in which technology and its so results appear. The relationships of production made appearance as an active factor in technological progre

Socialism is differentiated from capitalism primari the type of relationships of production. The new relat ships of production assure fundamental advantages an plain the special features of technological progress un socialism.

first and most important feature guaranteeing high
of technological progress under socialism is the cir-
ance that technological progress is carried out in the
sts of raising the living standard of the working peo-
As a result, the workers have a material incentive in
celeration of technological progress.
er the conditions of the socialist system, the means
duction are owned by the working people, and there-
he savings obtained as the result of technological
ess belong to the working people themselves. The
of appropriation of the results of technological prog-
ndergoes a fundamental change when compared with
uation under capitalism.
er socialism, the principle of material incentive has
der significance than a simple relationship between
mption and the quantity and quality of labor. The lev-
naterial well-being of the working people depends
ly upon the amount of labor expended but also upon
ving of labor obtained as the result of technological
ess. The quantity of output produced, including the
ction of consumer goods, rises primarily as a result
nges in the technology of production.
ocialist society, we witness not only an expansion of
nits within which machines are employed, but also the
within which technological progress may be materi-
ewarded.
x pointed out that the saving of time becomes more
law under socialism. This fact is of particular sig-
nce not only in the sphere of production but also in the
bution of material goods.
level of material well-being is dependent not only
he quality and quantity of the labor expended, but is,
ever greater degree, determined by the labor saved.
reates a basis for material incentives in technical
ess such as no prior system of production has known.
he advance to communism, the well-being of the
ng people will be determined to an ever increasing de-
y the technological possibilities for improving labor
ctivity. The wealth of society will, in the very broad-
nse, actually be determined by the saving of time,
e material means for the realization of this saving
e a historically unprecedented technological progress.
universal material interest displayed by working
in the acceleration of technological progress is the
f its second important feature under socialism — the
evel of creative activity of the masses of working
in the struggle for new technology.
hnological progress rests on the experience of mil-
of working people and their day-to-day experience in
ction. "...The brains of tens of millions of creators,"
. I. Lenin, "will create something incomparably
r than the greatest prevision of genius." (3)
socialist system opens a broad highway for the all-
development of technical creativity. More than a
n and a half workers, engineers, technicians, and sci-
personnel in the USSR take a direct part in invention
tionalization. In terms of the number of rationaliza-
ggestions the USSR considerably surpasses the
States, England and other capitalist countries. As
as 1956, the number of suggestions advanced in the
was 600,000 more than in the USA, and 1,600,000
than in England.
high level of creative activity on the part of the
s of the people is a major motive force and an im-
t feature in the development of technology under so-
n.
planned nature of the development of technology, and
ving of social labor related thereto, constitute a
third major feature of technological progress under socialism.

Whereas the technological development of capitalist production is distinguished by extreme unevenness and profound disproportions, the technological foundation of socialist production experiences a proportionate development and is characterized by the planned introduction of technology into all the branches of the national economy.

Social ownership of the means of production makes it possible to employ the advantages of a planned economy in the interests of technological progress, to provide for the necessary proportions and concentrations of forces and resources in the decisive segments of development of the technology.

An important feature of technological progress at the present stage is the fact that this progress is effected on the basis of an intimate scientific and engineering collaboration among the countries of the world socialist system. Whereas, under capitalism, every effort is made to maintain the monopoly in technological progress held by the advanced countries, the most advanced socialist countries, on the other hand, unselfishly extend broad technical aid to the previously backward countries. Thus, during the period that scientific and technological collaboration has been in existence, the USSR transferred 9,000 sets of plans and specifications for major construction projects, the manufacture of machinery and equipment, and the organization of production processes to the socialist countries. The scale of Soviet technical aid to these socialist countries is most vividly illustrated by the fact that 550 enterprises and 169 other installations and shops have been built there with the aid of the Soviet Union. This includes, among other things, 46 iron and steel mills and plants, 37 chemical, 11 oil refining and 76 machinery manufacturing enterprises, 73 electric power plants, etc.

The scientific and technological collaboration of the socialist countries yields positive results for each country. Thus, for example, as a result of a visit by personnel of the Brandenburg Steel Rolling Works (German Democratic Republic) to the Soviet Union in 1955, and a visit by Soviet specialists to this enterprise, an increase of 180-200 tons of steel production per day was achieved at that plant.

The Soviet Union is also making use of the scientific and engineering experience of other countries. A Czechoslovak method of producing cast stamping dies which reduces by almost 90% the labor required for their manufacture and doubles their life, is being successfully introduced in the USSR. A Hungarian method of extracting coal from dump tailings at coal mines is being applied, etc. The scientific and technological collaboration of the socialist countries makes for a more complete revelation of the advantages inherent in the world socialist system, and accelerates economic and technical progress in each socialist country.

The features examined above constitute the specific motive forces of technological progress under socialism.

Stages in the Technological Progress of the Soviet Union

Each country which is a member of the world socialist system develops in accordance both with general laws applicable to all and with special features conditioned by the historically achieved level of the productive forces, the nature of the economic foundation, the position of the given country in the international socialist division of labor, the level of scientific development, the quality of the educational system, etc.

A number of the features of technological progress in the USSR were predetermined by the low starting point from which the development of the productive forces began under Soviet conditions. This was reflected both in the need for very rapid rates of industrialization, and the relatively broad employment of foreign engineering experience in the early stages, as well as in the specific difficulties of industrialization: the scarcity of skilled engineering personnel, the lack of a research and development base, etc.

As we know, Tsarist Russia lagged greatly behind the advanced West European countries in its level of technical development. This was manifested primarily in the slow development of the machine-building industry. In 1913 the share of machine building in total Russian industrial production was a negligible 6.8%.

The plan for the socialist reconstruction of Russia developed by V. I. Lenin envisaged the most rapid elimination of its backwardness in the technical and economic field, and the creation of the most advanced material and technical foundation for the new society. Lenin's plan for raising the level of the productive forces in Russia was based on the idea of the socialist industrialization of the country. In the history of our country, industrialization was a necessary process in the development of the productive forces. This process converted technologically backward Russia into a powerful industrial state.

The industrialization of the country led to fundamental shifts in the technological level of the national economy. New branches of industry arose during the years of industrialization, and marked qualitative changes occurred in the structure of industrial production.

The manufacture of machine tools proceeded at a most rapid pace during the years of industrialization. The process of development and mastery of new types of equipment and of production procedures was uninterrupted. The percentage of products being manufactured in the USSR for the first time increased from year to year, as is indicated by the following figures characterizing this process at the beginning of the 1930's:

Table 1

Relative Share of New Products in the Output of Soviet Machine Building
(in % of total output of machine-building industry)

	1930	1931	1932
New products	9.2	25.5	42.3

Industrialization resulted in fundamental shifts in the entire structure of the national economy; machine building grew on the basis of the development of the mining and metallurgical industries, and a corresponding growth in power capacity. The development of machine building was accompanied by large-scale introduction of chemistry into the national economy, etc.

The superiority of socialist relationships of production was manifested in the successful solution of the problems of industrialization in the USSR. This found its reflection in the particular method employed in socialist industrialization.

At the 18th Congress of the Party, J. V. Stalin set forth the following proposition as the most important generalization on the development of the national economy: "New technology constitutes the foundation of our industry and agriculture. It may be stated without exaggeration that from the point of view of the degree to which industry and ag culture are saturated with new technology, our country the most advanced as compared to any other country, v old equipment hangs like a millstone retarding production inhibits the introduction of new equipment."

This statement by Stalin essentially reflected the sta of the equipment at our enterprises and level of techno during that period. It is a fact that some 300,000 of th very finest, high-output machine tools were purchased abroad from 1929 to 1940, tools manufactured by the b companies all over the world.

The production of machine tools in our country progr with due consideration for the advanced experience machinery manufacture abroad. The turning lathe mad our country at that time, which honorably won the nickname "catch up and surpass" was in no way inferior to universal lathes then being made by the best manufactu in the entire world.

During the first ten years of the post-war period, th USSR successfully solved a number of complex problem in the field of development of new technology: the worl first atomic electric power plant went into operation, the Soviet Union was the first to discover the secret of leasing the energy of the hydrogen nucleus. These yea saw the solution of extraordinarily complex problems jet and rocket engineering, and the problems of produc new types of fuels and materials were technologically solved. The scale of manufacture of new products was panded, etc.

However, both during the war years and during the i mediate post-war years, there was a certain degree of in the technological equipment of a number of the mass duction branches of industry: machine-tool manufactu oil refining, the production and employment of syntheti materials, etc.

This situation may be illustrated in any one of a number of fields.

From 1946 to 1955, our machine tool and instrument dustries mastered the output of 200 new types and size automatic and semi-automatic machine tools. Howeve this most progressive category of machine tools, our available number lagged behind that of the United State during the post-war years.

In 1955, our petroleum industry seriously lagged in terms of the scale of introduction of such advanced pr esses of petroleum refining as catalytic cracking, cata reforming, and the coking of heavy residues. The low el of employment of new technology in petroleum refin was due to the slow rate of industrial mastery of new esses. Thus, more than ten years were required to develop and secure the introduction into industry of our versions of catalytic cracking.

American industry also substantially surpassed the in the level of production and introduction into the nati economy of synthetic and other chemical materials, th gross tonnage ratio between the two countries being ap imately five to one.

Technological progress in the post-war decade also played a number of other shortcomings, and this was flected specifically in a mistaken attitude toward the of and adaptation of foreign experience.

Of substantial importance to technological progress the national economy were the resolutions of the July Plenum of the Central Committee of the CPSU (1955), which the status of efforts to introduce new technolog subjected to deep and searching criticism. The July num of 1955 recorded the fact that the USSR lagged in development of a number of branches of new technolo ared to the most advanced foreign countries, both in s of quality and efficiency of utilization, and particu- in terms of the scale and the period required to in- ce this new equipment.

ring the period subsequent to the 20th Congress of the , which determined the major objectives in the field celerating technological progress, a fundamental e with respect to the introduction of new technology oted.

ring this period, more than 5,000 new and more ad- d machines, mechanisms, assemblies and instruments developed and placed in serial production. Progres- echnological processes in industry and construction developed and introduced. The level of mechanization utomation of production was raised in all branches of conomy, and specifically, there was a substantial im- ment in the age structure of the machine tool stock of SSR. In 1958, machine tools less than ten years old sented 45% of the total in the USSR, and 40.3% in the

most important factor in the acceleration of techno- l progress was the reorganization of the management ustry and construction. In the course of a brief peri- e new councils of the national economy demonstrated st superiority of this type of industrial management. ates of growth of industrial production increased, was a substantial improvement in the utilization of n resources for increasing production. The initiative ctivity of the working class and of the engineering and ical personnel grew. The reorganization of the man- ent of industry and agriculture created broader possi- es for further acceleration of technological progress. launching of the world's first artificial Sputniks and bsequent steps to conquer cosmic space, the manu- e of ultra-high-speed and ultra-long-range aircraft, ogress made in mastering atomic energy for peace- rposes and in the spheres of radio electronics and the facture of transistors — these are striking testimonies enormous achievements which demonstrate to the en- orld that Soviet science and engineering have scored triumphs in the decisive sectors of world technology.

Means of Accelerating Technological Progress at the Present Stage of Development

21st Congress of the CPSU defined a qualitatively tage in technological development, the result of which at the USSR took a decisive step toward the creation material and technical foundation of communism.

Seven-Year Plan for the development of the economy USSR in 1959-1965 fully reflects the basic trends in rn scientific and technological progress. A charac- ic feature of the current state of development of tech- in the USSR is the fact that the creation of the mate- nd technological basis for communism occurs under nditions of the second technological revolution, which eating the scientific and engineering prerequisites for astic acceleration of the rates of economic and tech- ical progress.

ereas the industrial revolution at the end of the 18th ry provided a basis in technology adequate for capi- , the modern technological revolution is laying the ation for rapid rates of development of the material chnical foundation for communism. The industrial tion made it possible for factory production to ex- y leaps and bounds, and resulted in a tremendous de- ment of manufacturing. Thus, for example, the tran- from manual to mechanical spinning resulted in a 130-fold rise in labor productivity during the first forty or fifty years alone. The scientific and technological progress now underway, resting upon the exceptionally rapid development of such recent branches of technology as atomic power, radio and electronic engineering, the building of computing machines, rocket and jet technology, the development of the leading branches of the chemical industry, makes for much more rapid rates of technological progress than was the case during the industrial revolution. It opens up broad possibilities for a fundamental change in the methods of production, and creates the prerequisites for developing the production process along the most efficient and optimum path, with the prospect of complete elimination of manual labor.

Automation is the foundation of the technological revolution of today. Automation exercises a determining influence upon all elements of technological progress. Only automated technology can make possible the control of atomic and thermonuclear reactions or direct many other industrial processes inaccessible to direct intervention by human beings.

Facts offer convincing testimony as to the high efficiency of automation in the field of economy of living labor: increasing the precision of production, sharply reducing the production cycle, and improving the quality of production. Experience shows that automation of technological processes makes it possible to reduce the number of machine-serving personnel by 25% in ferrous metallurgy and 20% in the chemical industry, to increase the output of ferrous metallurgy and the chemical industry by 10-15%, to reduce production costs at electric power plants by 20-25%, in ferrous metallurgy by 20%, and in the chemical industry by 10-15%.

According to the data of a study conducted by the Central Statistical Administration of the USSR, the average gain resulting from the introduction of each single automation and mechanization measure was 98,600 rubles per year on an annual basis averaged over 121 enterprises in the iron and steel, chemical, machine-building, light and foodstuff industries, and the capital investments were recouped in one-and-a-half years on the average.

Upon transition to all-round automation, based on conveyor belt and continuous processes, we may expect a further 50% to 100% increase in labor productivity, and in some cases even more.

The accelerated development of the chemical industry is a most important feature of the present stage of technological progress.

In accordance with the target figures for 1965, the total volume of production of chemicals in the USSR will almost treble, and the output of synthetic fibers will increase by nearly four times, while that of plastics will rise more than seven-fold. The employment of plastics and other synthetic materials will have an enormous effect upon the rates of technological progress. The role of chemistry in the development of consumer goods is exceedingly large. Thus, for example, two-thirds of the entire increase in the production of fabrics per head of population during the Seven-Year Plan will come from the use of artificial and synthetic fibers. In order for such an increase to be attained, were we dependent upon agricultural raw materials, it would be necessary to have 80 million additional sheep and to raise an extra 350,000 tons of raw cotton. "The accelerated development of chemistry," said N. S. Khrushchev, "is a matter of vital importance for our people, and for the creation of a material and technical base for communism."

The June Plenary Session of the Central Committee of the CPSU (1959), in calculating the first results of the fulfillment of the decisions of the 21st Congress of the Party, undertook an all-sided examination of, and defined concrete measures for, the further accelerated development of all branches of the economy of the USSR on the basis of a broad introduction of all-round mechanization and automation of production, an increase in the level of economic and organizational activity, an improvement in the practices employed in planning and financing new technology, and the development of the creative initiative of the working people in the struggle for technological progress.

The creation of the material and technical foundation for communism is a social transformation involving not only a broad range of technological problems, but also problems in the field of economics, politics and culture.

A most important condition for the acceleration of technological progress is a more complete utilization of the advantages of the socialist economic system in the sphere of the development of new technology. We refer chiefly to such important levers for accelerating technological progress as proper planning and material incentives.

The June Plenum revealed serious shortcomings in planning practices with respect to technological progress. The development of new equipment projected in the plans was not organically coordinated with the objectives for increasing the output of products, improving their quality and reducing cost, as well as for increasing the productivity of labor. To this day, planning has not taken into consideration the expenditures of enterprises on mastering new types of equipment and carrying out research work, nor for experimental construction, nor have adequate funds been appropriated for this purpose, and this has had a negative effect upon the economic indicators of enterprises. In 1958 and 1959 no single general governmental plan for the most important measures to be taken in the development and introduction of new equipment was prepared. This complicated the introduction of a single line of technological policy in the development of the branches of the national economy, the utilization of the latest achievements of native and foreign science and technology, the organization of inter industry cooperative deliveries in the development of ne machines, and the checking and control over performanc

The resolutions of the June Plenum were directed toward eliminating the existing shortcomings in the plann of new technology at all levels. The Plenum found that c jectives with respect to the most important work to be done in developing and introducing new technology must an organic component of the national economic plan, and the measures to be taken in introducing the new technolo must be given first priority in terms of supply of mater and equipment.

A most important criterion for the scientifically valid planning of technological progress is the determination the economic effectiveness of the new equipment. However, the scientific level at which this problem is being worked out is lagging behind the requirements of life.

The index of annual economic benefit is still used as t major criterion for the effectiveness of new technology. This is clearly inadequate for an all-round evaluation of results of the employment of the latest technological achievements in production. It is an overestimation of t significance of this index which is currently obstructing proper posing of long-range problems in technological progress. The need has now arisen for the planning of technical progress not on the basis of the annual econom effectiveness and the recoupment period index, but in ter of the total national economic effectiveness over the rel vant long-run period. Let us use a calculation to make this clear. Let us assume that a machine tool plant is mastering the production of a new serial-manufacture m chine tool, the annual saving from the employment of a single machine tool to be 50,000 rubles. The machine to will be in use for four years, if one makes allowance for solescence. The machine tool is expected to be manufac tured for a three-year period, and the scale of producti will be the following: first year — 100 units, second ye — 150 units, third year — 200 units. These data lead us the following results (see Table 2).

Table 2

Calculation of Effectiveness of Developing, Producing and Employing a New Type of Machine Tool, Model 1-11, Entering Serial Production During 1959-1965 (in thous. rubles)

	Savings derived from use of machine tools produced in each of the indicated years			
	1959	1960	1961	Total
1960	5,000*			5,000
1961	5,000	7,500		12,500
1962	5,000	7,500	10,000	22,500
1963	5,000	7,500	10,000	22,500
1964		7,500	10,000	17,500
1965			10,000	10,000
Total	20,000	30,000	40,000	90,000**

* Annual effectiveness

** Long-run effectiveness

The table shows that the total effectiveness of the development, production and employment of this new type of machine tool to be manufactured in serial production will be 90,000,000 rubles for the period envisaged, whereas the annual economic effectiveness of the employment of the machine tool manufactured during the first year is only 5,000,000 rubles in all.

Depending upon whether the practices employed in pl ning are based on the annual effectiveness or the nation economic effectiveness over the long-run period, we no only "stretch" the material possibilities for arranging pricing system that will stimulate the introduction of n equipment, but we see a substantial change in the appro

e problems of technical progress. It becomes possible,
e basis of calculations of the national economic effec-
ess over the long-run period, to construct a truly sci-
ic system of planning and rewards for technological
ress.

e resolution of the June Plenum of 1959 states, "In
il economic practice we continue to make weak use of
principle of material incentive for workers, engineer-
nd technical personnel of enterprises and construction
ects, the specialists in scientific research, planning,
lesigning organizations, in the development of new tech-
gy and the most rapid introduction thereof into production."

e system of bonuses for new equipment operative since
occupies a very modest place in the general organiza-
of payment to labor in industry. In the first place, it
es only to personnel in the machine-building industry.
onnel of other branches of industry, into which this new
oment is being introduced, are not rewarded under this
em. In the second place, the percentage share of
ses paid for new technology in total wages is exceeding-
nall. For the machine-building industry as a whole,
s for payment of bonuses to personnel for the develop-
and introduction of new technology constitute less than
f the total payroll for persons engaged in actual indus-
production in this field. Furthermore, if we consider
the expenditure of these funds from 1956 to 1958 repre-
ed only 30% to 60% of the money available for the most
rtant group of economic councils, the figures we have
are actually substantially lower in practice. In the
place, the organization of bonus payments under this
em is awkward and excessively centralized.

in the past, in order for enterprises and organiza-
to receive bonuses for each new piece of equipment
loped, it is necessary to present to the economic coun-
he whole of the documentation that formerly had to be
oved by the ministry. Thus, for example, the SAM
at Ryazan had to fill out 12 questionnaires and calcula-
documents in order to get a bonus of 50,000 rubles for
echnology. The Ryazsel'mash plant had to submit 16
documents in order to get a bonus of 32,400 rubles.
number of signatures of approval required for these
ments ranged as high as 20. If we take into considera-
that each such signature usually represents someone
a considerable staff behind him, an extraordinarily
plex procedure emerges. As a result, there is a sub-
ial time lag between the performance of the work for
ntroduction of new equipment and the date of receipt of
ses for it. This seriously impairs the efficiency of
s payments at these enterprises and diminishes the
ulating effect of this type of reward.

the most general form, the problem of creating a ma-
l incentive for enterprises in technological progress
ces itself to creating an organic link between the rise
erage wages and the indices characterizing the eco-
c results of technological progress. It appears, even
e most cursory examination, that these indices are the
important qualitative indicators of the functioning of
terprise.

e most general economic result of technological prog-
is a saving of working time. This result is simultane-
reflected in the dynamics of three qualitative indices
e operation of an enterprise: production costs, labor
uctivity, and profit.

other conditions being equal, a given economy of time
lting from technological progress will be reflected in a
reduction in production costs, in the form of a rise in
productivity, and finally in the form of an increase in
ass of profits.

It would appear that it is enough to determine and approve, with due consideration for the special features of the economy of various groups of enterprises, one of the foregoing indices to be employed as the basis for constructing a satisfactory system of material incentives for the enterprise for technological progress. This approach would be correct if technological progress meant merely the introduction of new equipment. The problem is complicated by the fact that, in the real process of social production, technological progress includes not only the introduction of new equipment, but the production thereof.

From the point of view of their role in technological progress, industrial enterprises may be subdivided into two groups:

First group — enterprises in which technological progress includes both the production and the introduction of new technology. This includes machine-building enterprises in the first place.

Second group — enterprises at which technological progress consists chiefly of the introduction of new equipment. Here we include primarily enterprises in the mining branches of industry, and enterprises in the light, foodstuffs and other industries.

The grouping of enterprises according to their role in technological progress is by no means a mere formality, as the difference in their role in technological progress is directly reflected in the dynamics of the major qualitative indices of operation of these enterprises.

To the degree that the relative share of new products increases in the production program of the enterprise, to that degree there is a reduction in the comparable output for which economies from cost reductions may be calculated. If the growth in the bonus fund for the former of the two groups of enterprises listed is made dependent upon the savings due to cost reduction, we would not have a stimulus for the manufacture of new products, because upon conversion to a new product there would be a relative decline in comparable output. Under these circumstances, an increase in the share of its output devoted to new products would hit the enterprise right in the pocketbook.

At first glance, it would appear desirable to establish two sources from which a bonus fund can be derived for the enterprises in the first group:

(1) from economies within the enterprise due to a reduction in the costs of production of comparable products;

(2) through a redistribution of "external" economies derived in the economy as a whole due to the employment of new products, this being done by adding a special bonus markup to the price.

However, such a solution would provide a dual stimulus to the economies of the enterprises in group one, which would have to be constantly balanced by changing the level of allocations coming from the savings due to cost reduction, and also by making a continuous series of corrections in the size of the bonus markups included in the price of new products. Under these conditions, the ratio of the amounts entering the bonus fund from the two sources should be such as to cause the size of the bonus fund to be larger when the relative share of new products in a plant's total output is larger.

In this case, the most practical would be a unique solution which would be based upon the correct choice of the major index which best characterizes the given group of enterprises from the viewpoint of the whole economy. The "external" economy obtained from the employment of a new product in the national economy can serve as a guiding index for enterprises making the new products. For enterprises in this group, the production of an improved product is the major consideration from the viewpoint of the plant's role in technological progress, and solution of this problem takes precedence over all other aspects of the activity of the enterprise, including that of the installation of new equipment itself.

The experiences that have been accumulated in the sphere of material incentives for new output in the radio engineering industry show that a supplementary stimulus in the form of a premium markup for producing each unit of a new model will reduce the time required to get a new model into production and will result in a sharp increase in the scale of production and in cost reduction.

In so doing, it is necessary to establish a procedure in which the scale of the markup included in the price of new products undergoes a steady diminution during the period in which this type of product is manufactured. For example, the markup during the first year could equal the base price, i.e., 100%, the second year 60%, and from the third year on 10%.

Stimulation of enterprises by means of a diminishing scale of markups would compel their collectives to raise the output of new products, and to seek an increase in labor productivity during the very first year.

The all-round and complete utilization of technological possibilities, and of the economic advantages of the socialist economic system on the basis of broad labor initiative by the masses, is of major importance for accelerating the rates at which the material and technical base for comn nism is developed.

The economic achievements, the technological triump and the scientific discoveries taking place in the sociali countries are changing the relationship of forces each y in favor of socialism. By 1965, more than one-half of th world's industrial production will be coming from the s cialist system. This will assure its superiority in the d cisive field of human activity — production of material goods.

The successful fulfillment of the Seven-Year Plan for development of the national economy of the USSR, and o long-range plans of other socialist countries, is a new a convincing proof of the advantages of socialism over ca talism in the struggle for technological progress and a b ter future for the peoples.

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Planovoe Khoziaistvo — No. 12, 1959

Garbuzov:

Budget That Assures the Soviet Union's
nomic and Cultural Progress

e state budget of the USSR for 1960, adopted by the
session of the USSR Supreme Soviet, is the budget of
econd year of the Seven-Year Plan. It reflects the
er advance of the socialist economy and the rise in the
rial and cultural standards of the people and provides
inds necessary for carrying out all the measures en-
ed in the 1960 national economic plan.

e budget proceeds from the historic decisions of the
Congress of the CPSU, which ushered in a new period
e development of the Soviet Union, the period of com-
nsive building of a communist society.

e Soviet people are working with great enthusiasm to
ment the decisions of the 21st Congress of the Com-
st Party and the June (1959) Plenary Meeting of the
al Committee of the CPSU and are striving for ever
successes in the development of socialist economy and
re. The political and production activity of the masses
owing steadily, socialist emulation for the early com-
n of the Seven-Year Plan assignments and the mass
ment of communist labor teams are spreading ever
r.

e economy of the USSR is in the process of a mighty
sion. Each passing year reveals ever more fully the
ive results of the measures carried out on the initia-
f the Central Committee of the CPSU to reorganize
trial and construction management, further develop the
tive farm system and reorganize the machine and
r stations. These measures stimulated the construc-
fforts of the masses, made it possible to utilize more
the advantages of the socialist economic system and
d the level of socialist planning. In the first 9 months
59, socialist industry exceeded the total industrial out-
an by a considerable margin. The assignments in la-
roductivity and reduction of production costs were ex-
d. The above-plan savings in industry as a result of
g production costs totalled over 7 billion rubles.

e high rates of growth of heavy industry and the suc-
ul fulfillment of the measures mapped out by the
for a sharp advance in agriculture made it possible
and steadily the output of consumer goods and retail
. The national income is rising considerably from
to year.

e superiority of the socialist system over the capital-
stem is strikingly reflected in the unprecedentedly
growth of the productive forces, the continuous rise
living standard and the remarkable achievements of
science and engineering.

e truly progressive nature of the socialist system is
eflected in the foreign policy pursued by the Soviet
.

nks to the consistent peaceful policy of the Central
ittee of the Communist Party and the Soviet govern-
thanks to the purposeful and indefatigable activities
outstanding champion of peace and friendship among
tions, Comrade N. S. Khrushchev, a change for the
better has taken place in international relations of late, and possibilities have been created for abolishing the cold war and ensuring a lasting peace among the nations. The recent visit of Comrade N. S. Khrushchev, Chairman of the USSR Council of Ministers, to the United States of America and his statements in that country were of outstanding historic significance: they raised still higher the international prestige of the USSR, were an important contribution to easing international tension and strengthening of peace among the nations and won the gratitude and appreciation of all the peoples.

The great successes scored by the Soviet people under the leadership of the Party in all spheres of communist construction have laid a solid economic basis for the fulfillment of the budget, and have facilitated the further consolidation of state finances and money circulation. In 1959 state budget revenue is expected to reach 735.8 billion rubles, and expenditure is to reach 698.8 billion rubles — an excess of revenue over expenditure of approximately 37 billion rubles.

The considerable excess of revenue over expenditure, together with the increase in the free funds of the national economy in the banks, facilitate a rapid growth in the credit resources of the State Bank and the Construction Bank. This makes it possible to expand bank credits in conformity with the increase in the volume of production and trade. In view of the continuous growth of production and trade, and also the over-fulfillment of production plans by many enterprises, bank credit investments have risen substantially in recent years. Whereas on January 1, 1958, the total sum of credits to the national economy granted by the State Bank amounted to 263 billion rubles, at the end of 1959, according to preliminary data, they will be close to 380 billion rubles. The share of budget funds in the credit investments of the State Bank will increase from 43% at the beginning of 1958 to 51% at the beginning of 1960.

The 1960 national economic plan adopted by the USSR Supreme Soviet calls for a considerably greater increase in industrial output than originally envisaged for the second year of the Seven-Year Plan. In the first two years of the seven-year period, it was pointed out at the session, the original industrial output targets will be exceeded by approximately 100 billion rubles. Total industrial output in 1960 will rise by 8.1% as compared with 1959, with development being most rapid in the metallurgical, chemical, machine-building and other heavy industries. Production of consumer goods will increase 6.4%; at the same time a wider assortment and better quality of these goods is called for. A further increase in the output and procurement of farm produce, higher yields and greater livestock productivity are envisaged. The national income will rise faster than originally scheduled, which will give the economy greater resources for expanding output and will bring the people more of the good things of life. In 1960 the national income will rise by approximately 9%.

In 1960 the population will buy considerably more goods. Total retail sales will increase by approximately 50 billion rubles and will reach 765 billion rubles.

The budget has been drawn up on the basis of the national economic development plan for 1960 and fully ensures the funds needed for carrying out the measures envisaged by the plan for developing the socialist economy, raising the living standard of the people and strengthening the country's defences.

The 1960 state budget of the USSR has been approved as follows: 773 billion rubles of revenue and 745 billion rubles of expenditure, an excess of 27.2 billion rubles of revenue over expenditure. The volume and share of the budgets of the Union republics will rise still more: these budgets have been set at 387.9 billion rubles, i.e., 44.4 billion rubles above the sum approved for 1959. The budgets of the Union republics in 1960 will take up 52% of the total Soviet budget as against 26% in 1955. The larger budgets of the Union republics reflect the measures carried out by the Party and the government for enhancing the role of the Union republics in the economic and cultural spheres and attest to the steady advance of their economies and culture. Almost the entire economy is now under the jurisdiction of the Union republics. The role of republic bodies in national economic and financial planning has risen immeasurably. Almost the whole of industry, agriculture, trade, many educational and public health measures are now financed from the republic and local budgets.

The budget rights of the Union republics are being extended consistently. Of great importance in this respect is the Law on the Budget Rights of the USSR and the Union Republics adopted at the third session of the USSR Supreme Soviet. It reflects the essential changes in the content of the USSR state budget resulting from the complete and final victory of socialism in our country. The law lays down the basic principles which give the Union republics extensiv rights in deciding financial and budgetary matters. It s nifies an important stage in the development of socialis democracy which makes it possible to properly combine centralized state guidance of the economy with maximu stimulation of the activities of the masses, development the initiative of republic and local bodies and enhancement of their role and responsibility for carrying out na tional economic plans.

The increase in the output and scale of industrial and agricultural products envisaged by the national economi plan for 1960 determines the further rise in budget receipts from the socialist economy. In 1960 this revenue will amount to 702.6 billion rubles, 46.6 billion rubles m than in the preceding year. The share of receipts from socialist economy in the state budget of the USSR will r still more and reach 90.9%. The biggest increase will b registered by the profits tax, which should bring in 203 lion rubles. To ensure the receipt of this revenue the a signments in labor productivity and production costs mu be fulfilled. Total profits of state enterprises and economic organizations will amount to 285,300 billion ruble in 1960, or 52,900 million rubles above 1959.

A considerable part of the profits of enterprises in 19 — 84.6 million rubles, or over 17 billion rubles more th in 1959 — will be placed at the direct disposal of enterprises and economic organizations for the expansion of duction, housing construction and satisfaction of the cul al and other needs of the workers. Such a system of di tributing profits, which ensures the necessary planned guidance of the use of socialist accumulations, at the sa time helps strengthen cost accounting and makes econo executives more interested in mobilizing internal reser

Profits of individual branches and the share going to t budget are seen from the following data (billion rubles):

	1959 Expected figures	1960 Total profits	of which:	
			Sums going to the budget	Sums left at enterprises
Entire national economy including:	232.4	285.3	200.7*	84.6
Industry and construction	143.3	182.7	124.8	57.9
Agriculture	4.8	8.3	2.1	6.2
Transport and communications	39.9	44.6	34.6	10.0
Trade	13.1	14.2	9.9	4.3

* In addition, 2.3 billion rubles will be paid into the budget by way of recalculating profits for 1959.

Profits for 1960 are estimated on the basis of the assignments of the national economic plan for expanding production and reducing its costs. In 1960 industrial production costs are to be cut by 1.9% as compared with 1959, and the cost of railway transportation by 2.5%. The cost of building and assembly work will be reduced by 1.5% as against the actual level in 1959. These targets for reducing costs are to give the national economy a saving of over 30 billion rubles.

The national economy has great potentialities for reducing costs and increasing profits. Successful fulfillment of the planned assignments for industrial production and the reduction of costs creates favorable conditions for the growth of accumulations in the economy.

The decline in turnover tax receipts in 1960 as comp with the sum approved for 1959 is due to a reduction of state retail prices of clocks and watches, bicycles, win and other goods, the abolition of the turnover tax on da industry products, changes in the wholesale prices of b products and sugar, and also the smaller planned outpu vodka and other alcoholic beverages.

In addition to receipts from the socialist economy, a 9% of the budget revenue will consist of payments and c tributions by various groups of the population. Taxes

e population have been set at 57.2 billion rubles, the
ase in saving banks deposits at 8.4 billion rubles, re-
s from the state 3% internal loan at 1.1 billion rubles,
eceipts from the lottery at 1.5 billion rubles (of which
nillion rubles will go for the payment of winnings and
lottery expenses).

x payments by the population are envisaged in con-
ity with existing laws, taking into account the growing
per of factory and office workers and the total payroll.

e share of taxes paid by the population in budget rev-
will decline from 7.8% in 1959 to 7.4% in 1960. A num-
f measures reducing taxes paid by the population have
carried out in recent years. A considerable number
ctory and office workers have been relieved from the
ent of taxes as a result of increasing the non-taxable
num. The number of people who pay the tax on bache-
and unmarried women has been sharply reduced. As a
t of these measures and also the earlier reduction of
gricultural tax, total taxes paid by the population have
cut by 12 billion rubles annually.

decision of the 21st Congress of the CPSU calls for the
tion of the collection of taxes from the people in the
few years. The Central Committee of the CPSU and the
rnment have instructed the USSR State Planning Com-
e, the Ministry of Finance, the State Labor and Wages
mittee of the USSR Council of Ministers and the All-
n Central Council of Trade Unions to work out pro-
s on the procedure and dates for carrying out this
ure. These proposals will be submitted to the govern-
in the near future.

ing to the further growth of incomes of the population,
deposits in savings banks will exceed 106 billion ru-
at the end of 1960, and the number of deposits will top
0-million mark. There are great opportunities to ex-
the operations of savings banks in the countryside in
of the increased money incomes of the collective farmers. Savings bank workers have the task of further improving service to depositors.

The accomplishment of the magnificent program of communist construction mapped out by the 21st Congress of the Communist Party is fully assured by the necessary material resources and money. The socialist state in a planned way, proceeding from the requirements of the economic laws of socialism, is assigning funds for expanded socialist reproduction, for the ever fuller satisfaction of the needs of society.

Planned disposal of financial resources, effected through the budget, the financial plans of enterprises and economic organizations and also through the credit system, is one of the important aspects of distributing the social product and the national income. Soviet finances are an active organizing force in the hands of the socialist state, which properly directs the movement of material values and ensures their most efficient utilization.

Total investments of the socialist state in the national economy have been fixed at 523.2 billion rubles for 1960, or 38.7 billion rubles above the sum allotted in 1959. Most of these funds, as hitherto, are channeled into socialist industry, and above all into heavy industry, which represents the solid basis for the steady advance of the entire national economy.

The biggest share of investments in the economy, namely, 327.5 billion rubles, is concentrated in the budget, with the help of which the state carries out the re-distribution of funds by branches and areas, proceeding from the general tasks of economic development.

The resources of state enterprises and economic organizations themselves represent substantial sums (194.7 billion rubles in 1960). These are profits, depreciation charges and other funds left at the disposal of enterprises and utilized in accordance with their economic and financial plans. The channeling of budget funds and the resources of enterprises themselves is given in the following table (billion rubles):

	Total under the 1959 plan	Total spending in 1960	of which:	
			Budget funds	Funds of enterprises and economic organizations themselves
Entire national economy including:	484.5	523.2	328.5	194.7
Industry	253.3	279.3	151.9	127.4
Agriculture	44.9	50.6	32.3	18.3
Transport and communications	52.9	57.3	25.4	31.9
Public utilities	—	31.4	28.6	2.8

addition to state investments, large outlays for eco-
c development are made by the collective farms from
own accumulations and also through bank credit. It
pected that in 1960 capital investments by the collec-
farms will amount to approximately 37 billion rubles,
ding 6.5 billion rubles of State Bank credit.

particular importance in the above expenditures is the
cing of capital investments and the increase in work-
apital. The plan for 1960 fixes total capital invest-
s at 256 billion rubles, or approximately 11% more
in 1959.

estments in heavy industry are being considerably increased. Investments in the chemical industry will increase by more than 30%, machine building by about 30%, metallurgical industry by 20%, oil and gas industry by more than 15%. Capital investments in the light and food industries will rise by 13.6% as compared with 1959.

In conformity with the decisions of the June (1959) Plenary Meeting of the Central Committee of the CPSU, large investments will be made to ensure technical progress in the economy. About 80 billion rubles, or 12.7% more than in 1959, will be spent for equipping the economy with new machinery.

Financing of capital investments (taking into account the needs of building organizations for working capital) will amount to 262.4 billion rubles in 1960. These include budget appropriations of 180.6 billion rubles, profits left at the disposal of enterprises and organizations of 34.3 billion rubles and depreciation allotments of 36.1 billion rubles.

The huge and constantly growing capital investments make it possible to steadily expand the fixed capital of enterprises in all branches of the economy, to increase production capacities, to introduce new technology and build houses and cultural and service establishments on a large scale. In conformity with the directives of the Party and the government to make the most efficient use of funds allotted for capital construction, measures to industralize building work and improve its organization as well as to cut costs have been carried out in recent years.

The activities of economic councils, which concentrate the management of all industrial construction within the given economic areas, facilitate better planning of construction, better utilization of construction personnel and ensure fuller utilization of building machinery and equipment and a reduction in the cost of building work. The measures carried out in this field have made possible a substantial saving of state funds and the concentration of capital investments on projects due for early commissioning and other important projects. Plans for the building and commissioning of production capacities were carried out more successfully in 1958 and the first 9 months of 1959 and the cost of building and assembly work was reduced.

The recent decisions of the USSR Council of Ministers on the course of fulfillment of the plan for building and commissioning of production capacities in 1959 is of great importance for the further improvement of construction. According to this decision the Councils of Ministers of the Union republics, the economic councils, ministries and departments must make the most rational use of the money and material resources allotted for construction so as to ensure the timely commissioning of production capacities and to reduce building periods to the utmost.

It should be noted that the utilization of capital investments and building and assembly work in 1959 proceeded better than in the proceding year. At the same time a number of branches have not fulfilled the assignments in the building and commissioning of production capacities. This is largely due to the dispersal of material resources and money over many construction sites and projects. Thus, the Lvov Economic Council did not plan the commissioning of a single enterprise out of the 14 building materials plants and building industry establishments which were under construction in 1959. At the beginning of 1959 the volume of uncompleted work on these projects amounted to 70 million rubles, but only 27 million rubles were allotted for the year. At the same time, new projects were added and these also were not to be commissioned in 1959. One of the reasons for the delay in fulfilling building plans is the belated preparation of designs and estimates.

Urgent measures should be taken to carry out the pla
for building and commissioning production capacities se
for each project which is to be put into service soon. At
same time, considerable work must be done to fulfill th
construction program for 1960 by providing the projects
be commissioned during the year with technical specifi
tions, timetables for organizing the work, equipment an
materials, and also by extending the production facilitie
of the construction organizations.

Construction organizations have great possibilities fo
meeting the assignment to cut building and assembly co
in 1960. Fulfillment of this assignment will yield an ad
tional saving of 2.7 billion rubles.

A considerable saving can be achieved through better
utilization of machinery at building sites. For example
at the Orsk Metallurgical Building Organization of the C
burg Economic Council idle time of bulldozers and towe
cranes in the first half of 1959 amounted to 43% of the t
during which they could be used. In some organizations
chain-bucket excavators, scrapers, tower cranes and ot
large building machines are idle for long periods of tim
Thus, in the first half of 1959 11 chain-bucket excavato
were almost never used at building sites in the Krasnoiars
Economic Council; the same applied to ten excavator
in the Altai Economic Council and three in Estonia.
Better utilization of machinery will speed up building
work and make for more economical and proper expe
tures of wages.

In a number of cases building costs are increased by
efficient use of resources allotted for expanding the pro
tion of building materials. For example, the Ivanovo E
nomic Council included in the plan for 1959 the building
and reconstruction of 25 small brick kilns at some indu
trial enterprises, although it is known that the productio
costs at such kilns are much higher than at large mech
anized brick works.

Building organization should see to the better utilizat
of equipment assigned for capital construction and the e
pansion of output. A check made by the Construction B
at the Kama Pulp and Paper Mills, the Novolipetsk Pla
and some other enterprises brought to light cases in wh
uninstalled equipment was poorly stored, sets of machi
were broken up and rendered unfit for use.

Greater output and the expansion of trade create a ne
for additional working capital to enable enterprises and
economic organizations to have normal stocks of raw a
other materials and fuel, and to make investments in u
finished production. Working capital in the national ec
my is growing from year to year and at the beginning o
1961 will reach 344.4 billion rubles, 27.9 billion rubles
more than the quotas at the beginning of 1960.

Distribution of the quotas of working capital by branc
of the economy is given in the following table (billion r
bles):

***

	Quotas as of:		Increase according to plan for 1960
	January 1, 1960	January 1, 1961	
Total including:	316.5	344.4	27.9
Industry	204.8	222.6	17.8
Agriculture	38.5	43.0	4.5
Trade	35.3	37.7	2.4
Transport and communications	14.6	15.7	1.1

e increase in working capital in 1960 will be provided e budget (7.3 billion rubles) and the resources of the prises themselves (20.6 billion rubles).

ort-term bank credit is likewise substantial now. Total -term credit granted by the State Bank will exceed 400 n rubles at the end of 1960. At present 44% of the bank t goes to industry, 45% to trading and procurement or- zations and 8% to agriculture.

make proper and most effective use of both the work- apital of economic organizations themselves and of credit is an important national economic task. The system of industrial and construction management has ted favorable conditions for better utilization of working al at enterprises and in economic organizations. This cilitated by the establishment of more rational coopera- n the sphere of deliveries and sale of output, the wider duction of the system of direct contracts between sup- s and clients and the measures taken by economic cils to redistribute surplus stocks available at enter- s. The Gorky Economic Council, for example, ar- es meetings every three months of the personnel in ge of supply, sales, machinery and power and of other atives of different enterprises. At nine such meetings us stocks of over 105 million rubles were redistri- in 1958; in the first eight months of 1959 the figure 74 million rubles.

the same time there are still shortcomings in the ation of working capital at many enterprises. Along- enterprises with inadequate quotas of working capital, are also some in which above-quota stocks are large. bove-quota stocks of finished goods consist in part of s with limited demand. Not infrequently such stocks mulate as a result of drawing up applications for mate- without due account of available reserves and actual rements. For example, the Sverdlovsk Bicycle Fac- having 51,000 meters of cycle chains at the beginning e year (with a stock quota of 15,000 meters), concluded tract for the delivery of 127,000 meters of chains — ll annual requirement.

make more proper and effective use of working capi- conomic councils and their departments should pay attention to the allotment of working capital to each prise in conformity with its production program, taking ures in case of necessity to redistribute this capital g enterprises in accordance with the annual financial .

e reorganization of industrial and construction manage- has brought about an improvement in the financial and mic indices of operation of industrial establishments onstruction organizations. Since 1957 the targets for ction costs and accumulations have been exceeded year.

all-round analysis of each type of expense and a thor- study of the separate elements of production and cir- on outlays are needed to fulfill assignments for re- g production costs and obtaining greater profits. A arison of the actual production expenses for the same f article at different plants is an important element h an analysis. There are instances in which the pro- n of the same article is highly profitable at some s or economic areas, whereas elsewhere it yields a rofit or even a loss. For example, the M-526 semi- atic gear-cutting machine was produced at plants of ussian Federation at a profit rate of 1.2% in 1958, in the Byelorussian Republic it was manufactured at a rate of 27.6%. The N-8 electric locomotive was pro- at plants of the Russian Federation at a profit and in eorgian Republic at a loss. A study of the best experience in producing some articles and its application at other plants will undoubtedly promote a general reduction in their cost of production and an increase in socialist accumulations.

An improvement in the technology of production opens up great possibilities for a still faster rise in labor productivity with a simultaneous reduction in the working day. The successful fulfillment of assignments to raise labor productivity is a factor contributing to additional output and the saving of funds in excess of the plan. A growth in labor productivity above the planned targets also facilitates a substantial saving in wages.

Guided by the directives of the Party to ensure a more rapid rate of growth in labor productivity than in wages, most industrial establishments and economic councils are achieving correct proportions in the rates of their increase. According to figures for the first 8 months of 1959, labor productivity in industry under the jurisdiction of economic councils rose considerably above the planned target and was 8.3% higher than in the corresponding period of 1958. Average wages during the same period increased by 3.2%. At the same time, in some economic councils the increase in average wages exceeded the rise in labor productivity, which led to the overexpenditure of the payroll. For example, in the Maritime Economic Council average wages grew by 6.9% in the first 8 months of 1959, whereas labor productivity increased by only 2.3%. In the Bukhara Economic Council the respective figures were 5.6% and 3.3%.

Great possibilities for reducing production costs are inherent in savings of raw and other materials, fuel and electric power. The development of technique and improvement of the technology of production open up ways of using many new types of materials, particularly chemical products such as plastics. The importance of cheap types of fuel such as oil and gas is growing in the country's fuel balance. At the same time the new forms of industrial and construction management make it possible to take fuller account of local raw material resources, to utilize by-products, to apply more rational forms of cooperation in the sphere of material-technical supply, which also helps to reduce production expenses.

Enterprises and economic organizations, taking advantage of these favorable conditions, achieve considerable savings of material values in the production of various goods. In the first six months of 1959 the industries under the jurisdiction of economic councils saved 2.7 billion rubles in excess of the plan on raw and other materials, fuel and electric power.

A correct system of quotas for the expenditure of materials can greatly facilitate a saving of outlays. Yet, as pointed out at the session of the USSR Supreme Soviet, there are shortcomings in planning the expenditures of raw and other materials. In some cases the material expenditure quotas are fixed without taking account of improvements in the technology of production. For example, the Karaganda Machinery Plant No. 1, improving the technology of production of metal props for coal mines, reduced the expenditure of special steel shapes by more than 3.5%, but the quotas for metal expenditures were not revised and the plans for steel deliveries both in 1958 and in 1959 were obviously too high.

Special attention should be paid to possibilities of reducing production costs at enterprises which still operate at a loss. A check made by financial bodies revealed that in many cases the losses are a result of incomplete utilization of production capacities, uneconomical expenditure of raw and other materials, failure to meet labor productivity targets and substantial non-production expenses.

The 1960 budget provides large sums for repair and service stations and state farms. The sum of 2.9 billion rubles is appropriated for financing capital investments, increasing working capital, and meeting operational expenses of the repair and service stations.

There are important failings in the work of the repair and service stations. In many stations the cost of repair jobs is still high because of shortcomings in the organization of labor and large overhead expenses. It is the task of these stations to provide better service to the collective farms in the repair of tractors and other agricultural machinery, to reduce the cost of repairs and improve their quality.

The sum of 30.9 billion rubles, or 7.2 billion rubles more than in 1959, is earmarked for financing the state farms. Budget appropriations will amount to 19 billion rubles, while the rest of the expenditures will be covered by profits, depreciation allotments and other resources of the state farms themselves.

To obtain the profits envisaged by the plan the state farms will have to cut production costs by 6.6% in 1960 as against the actual costs of production in 1958. All the possibilities for achieving this are available. The leading state farms cut production costs and obtain higher profits from year to year. Particularly valuable results in this respect have been achieved by the state farms established on virgin soil. But in many state farms production costs continue to remain high. Some of them still have considerable non-productive expenses, large losses and spoilage of produce during harvesting and storage. The elimination of these shortcomings will make it possible to more fully mobilize the available reserves for reducing production costs and ensuring profitable operation in all branches of state farm operations.

The agricultural personnel of our country are greeting the Plenary Meeting of the Central Committee of the CPSU with new achievements. New reserves for increasing agricultural production and reducing costs are constantly being brought to light in the collective farms and state farms. Our task is to fully take account of and tap all the potentialities for the continued accelerated advance of all branches of socialist agriculture.

State and cooperative organizations are spending annually about 6 billion rubles of budget appropriations and their own funds for extending the distributive network and equipping trading and public catering establishments. Large sums are also assigned for increasing the working capital of trading organizations. In 1959 the quotas of commodity stocks in trade were increased, for which purpose an additional 3 billion rubles were assigned from the budget. In 1960, in conformity with the planned growth of trade, the working capital of state trading organizations themselves will be further increased by 3.4 billion rubles. At the same time, state and cooperative trading organizations are expected to contribute 14.5 billion rubles to the budget in 1960. Payments to the budget and the timely financing of the contemplated outlays can be ensured if the plan of retail sales and reduction of circulation expenses is fulfilled. In 1959, however, many trading organizations did not fulfill their sales plans, notwithstanding the adequate supplies of goods and large stocks of above-quota commodities. Trading organizations still do not study the demand of the population sufficiently and do not bring enough pressure to bear on the assortment and quality of the goods produced by industry for sale to the population.

Trading organizations are confronted with the task of systematically cutting circulation costs, which are still high. Actually, the costs of retail trade in 1959 will exceed the estimated figure by over 500 million rubles. The los
of goods in excess of the established norms alone exceed
150 million rubles in the first half of 1959. Considerabl
attention should be paid to reducing overhead expenses i
the transportation, storage and sale of potatoes, vegetab
and fruits. The overhead costs on these products in stat
trading organizations were considerably above the plann
quotas in the first half of 1959, with the overexpenditure
ceeding 335 million rubles.

In 1960 the savings achieved as a result of a reduction
circulation costs in trade will amount to 1,040 million ru
bles, or approximately 3% of the total sum of these costs

Better organization of state and cooperative trade, a d
termined struggle against losses, and a systematic redu
tion in circulation costs will make it possible to reduce
penditures in the sphere of circulation and to save consi
erable funds.

With its tireless concern for the fuller satisfaction of
constantly rising material and spiritual requirements of
Soviet people, the socialist state steadily increases appropriations for social and cultural measures. In the la
five years budget expenditures for these purposes rose
more than 100 billion rubles and will amount to 247.8 bil
lion rubles in 1960. The share of social and cultural me
ures will reach 33.2% of total budget expenditures in 196
as against 27.3% in 1955 and 23.5% in 1940.

The distribution of appropriations for social and cultu
measures will be as follows (billion rubles):

	1959	1960
Education, training of personnel, science and culture	94.4	102.2
Public health services and sports	44.1	47.7
State social insurance and maintenance	93.7	97.9

In conformity with the Law On Strengthening the Ties
of the School With Life and the Further Development of
Public Education in the USSR, the necessary funds are
ing allotted for the reorganization of education, the intr
duction of production training in secondary schools, the
tension of the material facilities of schools, the expansi
of correspondence and evening education and the reorga
zation of vocational training. Greater sums are being a
lotted for the maintenance of boarding schools and children's pre-school establishments.

Large funds are being invested by the state in buildin
cultural and service establishments. In 1960, general e
cation schools for 700,000 pupils, pre-school establishments for 177,000 children and hospitals with nearly 30
beds will be built.

Budget expenditures for the training of personnel are
fixed at 22.1 billion rubles. The sum of 32.6 billion ru
will be spent on research; it will come both from the b
and from funds of economic organizations themselves.
large volume of these appropriations graphically reflec
the great concern of the Communist Party and the Sovi
Government for increasing the number of specialists i
spheres of the economy and for developing science and t
nology.

On the basis of the historic decisions of the 21st Con
gress of the CPSU, the Central Committee of the Party
USSR Council of Ministers and the All-Union Central
cil of Trade Unions have drawn up and adopted a decisi

e periods for completing the transfer of factory and
workers in different branches and economic areas to
rter working day and the adjustment of wages. Ful-
ent of these decisions will be an important step in in-
cing in the USSR the shortest working day and the
est working week in the world. In 1960 the sum of 14
n rubles is earmarked for these measures, of which
lion rubles is to come from the budget. Appropria-
for raising wages in 1960 will approximately equal the
ses of the state for these purposes in the preceding
years (1957-1959).

e large program of housing construction is an impor-
actor in raising the living standard of the population.
um of about 58 billion rubles will be spent by the
for housing in 1960; this money is to come from the
t, the enterprise fund, profits above plan and other
es of economic organizations, as well as bank credit.
e investments, plus the funds spent by factory and
workers who are building their own homes, will make
ssible to commission houses with a total floor space of
illion square meters in 1960.

penses for the maintenance of state administrative
s are fixed in the budget at 11 billion rubles, or 416
on rubles less than in 1959. Moreover, the budget
into account the saving of about 1.8 billion rubles as
ult of cutting expenses in 1960 on the managerial and
personnel of enterprises and economic organizations
re not engaged in production.

e Councils of Ministers of the Union and autonomous
lics, regional and territorial executive committees,
mic councils, ministries and departments accom-
ed considerable work in 1959 in improving the mana-
l apparatus and reducing the cost of its maintenance.
here are still quite a few extravagances in the struc-
and staffs of the managerial apparatus against which a
ute struggle must be waged. A considerable saving can be obtained, in particular, by doing away with unnecessary, intermediary managerial links, putting in order the network of supply and sales organizations, strengthening building organizations, repair and service stations, mechanizing computation jobs, eliminating extravagances in expenses for business trips and other measures.

Working for the most peaceful development of its economy and culture, the Soviet Union has in recent years considerably reduced its armed forces and the country's expenditures for defense. In the state budget of the USSR for 1960 defense expenditures are set at the level of 1959 — 96.1 billion rubles. The share of these expenditures in the budget is declining systematically and in 1960 will amount to 12.9% as against 19.9% in 1955.

The Soviet government is doing everything in its power to ease international tension and strengthen peace and friendship among the nations. The new proposals of the Soviet government on complete and general disarmament, outlined in the speech of Comrade N. S. Khrushchev at the UN General Assembly, have been fully supported by the peoples and the progressive circles in all countries. The adoption of these proposals, which open up a new era in the struggle for world peace, would make it possible to transfer huge material and money resources to constructive purposes and to substantially raise the living standards of the peoples. Concern for the peace and security of nations permeated the report of Comrade N. S. Khrushchev at the session of the USSR Supreme Soviet on the international situation and the foreign policy of the Soviet Union and the Address to the Parliaments of All Countries adopted by the Supreme Soviet.

Fulfillment of the state budget approved by the USSR Supreme Soviet will increase the wealth and reinforce the might of our country, promoting its advance towards communism.

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Planovoe Khoziaistvo — No. 12, 1

A. Strukov:

Problems of Accumulation and Consumption in the Seven-Year Plan

Planning of the national economy is done on the basis of the law of balanced, proportional development. A definite proportionality in the development of the national economy is ensured in the plan on the basis of this law. Among the major national economic proportions is the relationship between the accumulation and consumption funds in the national income. It will be recalled that the national income is the part of the social product which corresponds to the newly created value in the given period. In other words, the national income is the part of the social product which remains after deducting the value of material expenditures, that is, the value of raw and other materials, fuel, depreciation of machinery, equipment, buildings and installations, etc. Only this part of the social product may be used by society as income, that is, allotted for non-productive consumption and for accumulation. Consequently, given a definite national income, the possibilities for the growth of both consumption and accumulation depend solely on how and in what proportion this national income is used for the consumption and the accumulation fund.

Expanded socialist reproduction and the growth of consumption by the people presuppose a certain relationship between the consumption fund and the accumulation fund in the national income. The proportions between the consumption fund and the accumulation fund must proceed from their optimal combination, from ensuring a growth of both funds.

It was pointed out in the resolution of the 15th Congress of the Party: "As regards the proportion between *production* and *consumption*, it is necessary to bear in mind *that it is impossible* to proceed from a simultaneously maximal figure for the one and the other ... for this is an insoluble problem if we proceed from the one-sided *interest of accumulation*... or from the one-sided *interest of consumption*. Taking into account both the *relatively contradictory nature* of these elements and their interaction and interdependence — moreover, from the viewpoint of long-term development these interests coincide in general — it is necessary to proceed from an optimal combination of both these elements."* This, of course, does not presuppose an unchanging relationship between consumption and accumulation. At various stages of socialist construction, proceeding from the concrete tasks of each given period, these proportions have been different.

Thus, during the years of the first five-year plan the accumulation fund increased much faster than the consumption fund, as a result of which the share of the accumulation fund in the national income rose from 16-17% in 1926-1927 to 27% in 1932. Such a growth of the accumulation fund was determined by the concrete tasks of the First Five-Year Plan. The rapid pace of industrialization demanded considerable resources for the building up of heavy industry. In the first five-year period the national income rose by 82%, while state capital investments in 1932 were 180% above 1929. This is what determined the substanti increase in the share of accumulation during the first fi year plan.

The distribution of the national income into consumpti and accumulation is the final stage of distribution, its fi use. In its movement the national income goes through intricate process of production, distribution, redistribut and, lastly, final use. In the process of production not c the volume of the social product and the national income are determined, but also the conditions which predetermine the scale of accumulation and consumption are cre ated. The material content of the national income comprises the entire mass of consumer goods produced and that part of the means of production which is intended fo expanding production and creating reserves. In general means of production make up the overwhelming part of accumulation fund. Consequently, the more rapid growt in the output of the means of production (on the basis of law of priority development of Department 1) creates th conditions for raising the share of accumulation. The means of production created in industry are of decisive portance for the rise in accumulation. Industry contrib more than one-half of all the means of production and, w is most important, all the implements of labor.

A considerable part of accumulation, namely, acquisi of fixed capital, is done through the building of new indu trial establishments, roads, etc. The material outlays in construction (metal, cement and other building r terials as well as equipment) are covered solely out of output of heavy industry. Consequently, an increase in t output of heavy industry creates the material basis for panding the accumulation fund.

In turn, high and stable rates of production growth pr suppose, all other conditions being equal, the maintenan of a high rate of accumulation. The rates of growth of duction depend mainly on two factors: efficient use of t available fixed capital, and expansion of production faci ties as a result of new building, technical reconstructio and expansion of existing enterprises. The second fact plays a decisive part in long-term plans.

At present the consumption fund constitutes about thr fourths of the national income and the accumulation fun about one-fourth. This rate of accumulation assures ou country high and stable rates of growth of social produc Within the bounds of this relationship some changes occ in the share of consumption and accumulation in variou periods.

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The 21st Congress of the CPSU has mapped out a ma nificent program of communist construction in the Sovi Union. The primary tasks in the period of comprehens construction of a communist society are to build the m rial and technical basis of communism, to accomplish main economic task of the USSR and to assure the Sovi people the highest living standard in the world. The ions of the 21st Congress of the CPSU note that "the term plan for the development of the Soviet Union in ext 15 years envisages the creation of the necessary tions for completing the transition to communism."

**KPSS v resoliutsiiakh*, Part II, 1953, p. 333.

e Seven-Year Plan for the development of the national my in 1959-1965, adopted by the 21st Congress of the J, is a major component of the plan of communist con- tion. Accomplishment of the Seven-Year Plan will be isive stage in building up the material and technical of communism. The plan calls for increasing total in- ial output by approximately 80% and agricultural pro- on by about 70%, for carrying out a gigantic program pital construction, and for substantially raising the ma- l and cultural standards of the people.

e Soviet Union now has a powerful heavy industry and eloped agriculture. This has created favorable condi- for a considerable rise in consumption. In his report e 20th Congress of the CPSU Comrade N. S. Khru- ev pointed out: "Now that we possess a powerful heavy try developed in every respect, we are in a position to ly promote the production of both the means of produc- nd consumer goods."

conformity with this, the Seven-Year Plan provides for rates of growth of both the accumulation fund and the mption fund. The plan calls for increasing the na- l income by 62-65% and the consumption fund by 60- n the period 1959-1965.

e accumulation fund consists above all of the accumu- of productive resources which form the basis for the er expansion of production. These accumulations in- the growth of fixed capital and the accumulation of ing capital in production.

addition to the accumulation of productive resources, ccumulation fund includes: the accumulation of fixed productive resources, first of all housing and basic ties of cultural, medical and service establishments, ccumulation of consumer goods in trade and in the en- ises of producers; finally, the accumulation fund in- s the increase in the reserves of the means of produc- nd consumer goods.

estimate the possible scale of expansion of production necessary, alongside the accumulation fund, to calcu- he fund of expanded reproduction, which includes: first, ccumulation of fixed and working capital in production, econd, the increase in the consumption of workers who eing drawn into material production.

the course of the current seven-year period signifi- changes will occur in the structure of the accumula- und; there will be an increase in the share of accumu- of fixed capital in production, particularly fixed capi- the iron and steel, chemical, oil and gas industries. ltaneously, working capital in production will rise sub- ially. The growth of capital in production ensures rates of development for all branches of the national my.

pital construction, in the process of which the fixed al is created, is the main factor determining the vol- of accumulation. It should be taken into account that f total capital investments, a certain part goes for re- ng worn-out fixed capital and is financed out of de- ation allotments. That is why the accumulation of capital consists of the so-called net capital invest- s, i.e., capital investments made out of national in- . Since net capital investments comprise the over- ning part of total capital investments, the dynamics of nulation of fixed capital conform approximately to the nics of capital investments.

1959-1965 total capital investments in the national economy will amount to a colossal sum, approximately 3,000 billion rubles. Centralized state capital investments will amount to 1,940-1,970 billion rubles and investments by the collective farms to 345 billion rubles. This means that in seven years approximately as much money will be invested in the national economy as in all the previous years of Soviet rule.

State capital investments in 1959-1965 will rise by 80% as compared with the preceding seven-year period. With some reservations it may be assumed that capital investments in 1965 will also be approximately 80% higher than in 1958. Consequently, accumulation of fixed capital in state property will rise approximately in the same degree. Accumulation of fixed capital in production facilities will grow at a particularly rapid rate. Thus, while state capital investments in the national economy as a whole will rise by 80% as compared with the preceding seven years, capital investments in industry will increase by approximately 100%, including an increase of 140% in the iron and steel industry, over 400% in the chemical industry, 130-140% in the oil and gas industry, 130-140% in the timber, paper and woodworking industry, approximately 100% in the light and food industries; capital investments in transport and communications will rise by approximately 100%; capital investments of the state and the collective farms in agriculture will grow by nearly 100%.

As a result, there will be a considerable renewal of fixed capital in production facilities. In 1965 over 60% of the fixed capital in production will be made up of facilities commissioned in the course of the seven-year period.

The extensive program of capital construction of new enterprises is closely tied up with the acceleration of technical progress and the employment of new, more efficient machinery and equipment. In conformity with the decision of the June (1959) Plenary Meeting of the Central Committee of the CPSU important measurss will be carried out to accelerate technical progress and to replace obsolete machines with more productive ones. This will mean that the new fixed capital in production facilities commissioned during the seven-year period will be more efficient and productive. In other words, the effectiveness of utilization of the accumulation fund should rise substantially, which will create the conditions not only for the successful fulfillment, but also for the overfulfillment of the Seven-Year Plan assignments for expanding production.

In the seven-year period, in addition to fixed capital in production facilities, accumulation of non-productive facilities will rise considerably, first of all housing and public utilities, educational, medical, cultural and service establishments. State capital investments for these purposes will amount to 455-460 billion rubles in 1959-1965, as against 260 billion rubles in 1952-1958, or an increase of 75-77%. Capital investments in housing and public utilities will amount to 375-380 billion rubles.

23% of all state capital investments will go for the building of houses, the development of public utilities, educational, medical, cultural and service establishments. This figure approximately reflects the share of non-productive facilities in the total accumulation of fixed capital. The growth of this part of accumulation has a direct bearing on the rise in the living standard of the people. The expenditures of the state for building houses, schools, medical, cultural and service establishments will exceed 800 rubles per worker annually. Hence, it is clear that to get an idea of the living standard of the people in the Soviet Union it is necessary to take into account not only the consumption fund, but this part of the accumulation fund as well.

The Party and the Government have set the following task: to do away with the housing shortage, to solve the housing problem in the next 10-12 years. For this purpose it is planned to build houses totalling 650-660 million square meters of floor space, or about 15 million flats in 1959-1965 in towns and industrial settlements, communities at state farms, repair and service stations and timber camps with state capital investments, funds of the population and state credits. This will be 130% more housing than was built in the preceding seven-year period. In rural localities about 7 million houses will be erected by collective farmers and the rural intelligentsia. The housing facilities in towns and industrial settlements will increase by 60% at the end of the seven-year period.

Fulfillment of the huge program of capital construction will double the fixed capital of the national economy in seven years and thereby a solid base will be laid for the further expansion of all branches of the economy and for raising the material and cultural standards of the Soviet people.

The growth of the accumulation fund planned for the seven-year period is ensured both by material and financial resources. The material provision of the accumulation fund is determined by the development of heavy industry. In the course of the seven years the output of the means of production in industry should rise by 85-88%, with the production of the machine-building and metal-working industries increasing by approximately 100%, rolled metal by 53-63%, cement by 120-140% and pre-cast reinforced concrete elements and parts by approximately 150%.

As we know, the surplus product is the source of the accumulation fund. A rise in the productivity of social labor is the decisive factor in the growth of the surplus product, as well as that of the national income as a whole. The higher the productivity of labor, the less time, consequently, will be needed to reproduce the necessary product (provided it increases substantially), and consequently, the greater will be the volume of the surplus product. Fulfillment of the decisions of the June (1959) Plenary Meeting of the Central Committee of the CPSU on the acceleration of technical progress and the over-all mechanization and automation of production processes represents a decisive factor in ensuring a rise in labor productivity, and consequently, a growth of accumulation.

A major condition for ensuring a growth of accumulation is a reduction of production costs on the basis of a more rapid growth of labor productivity than of wages, a decline in expenditures of raw and other materials, fuel and electric power through the extensive utilization of advanced machinery and technology and better utilization of equipment. A growth in the accumulation fund is a necessary condition for the development and improvement of socialist production, and consequently, for an advance in the living standard of the people, for a rise in the consumption fund.

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In the Soviet Union the national income is truly national because it belongs to all the people. Moreover, about three-fourths of the entire national income goes into the consumption fund.

The consumption fund is made up of the following elements:

(1) Consumption of the population out of their personal incomes, namely:

consumption of products bought in state and cooperative trading establishments;

consumption of products received from collective farms or from the personal subsidiary plots;

consumption of products bought at the collective-farm market;

consumption of electricity, gas and water.

(2) Consumption of the population through enterprises and organizations in the non-productive sphere (educatio public health services, etc.).

(3) Material expenditures in institutions of general administration and scientific service.

Consumption of the population comprises the overwhel ing part of the general consumption fund, while only a sm percentage of it goes for material expenditures in institu tions of general administration and scientific service.

Retail sales of state and cooperative trading establishments play a big part in the consumption of the populatio At the end of the seven-year period, state and cooperativ retail sales will reach the huge sum of 1,080 billion rubl an increase of 62%. The sale of goods per capita will amount to 4,790 rubles in 1965 as against 3,214 rubles in 1958, an increase of 49%; it will be 280% above the figu for 1940. There will be a considerable improvement in structure of goods sold, and consequently, of the entire consumption fund, through increasing the share of the mo valuable foodstuffs, clothing, footwear and also househol goods and articles that go to meet cultural requirements

The share of goods other than food in the total market ble stocks will increase from 45.7% in 1958 to 46.8% in 1965; the share of fabrics, clothing and knitted goods wil rise from 18.1% to 19.7%. There will be a particularly la increase in the demand of the population for furniture, r frigerators, TV and radio sets and other durable goods which speaks of an improvement in the life and cultural level of the Soviet people.

The share of animal products (meat, milk, eggs) in tot retail sales will rise from 10% to 13.2%. This attests to further improvement in the diet of the population in accordance with scientifically substantiated standards whi ensure the all-round and harmonious development of ma Sales of meat products by the state and cooperative trad network will increase in 1965 to 5.6 million tons as agai 2.5 million tons in 1958; milk products (in terms of milk 36.2 million tons as against 19.4 million tons; eggs, 7,80 million as against 3,900 million; fish products, 2,655,00 tons as against 1,721,000 tons; sugar, 6,150,000 tons, an increase of 79%; confectionery products, 2,535,000 tons, an increase of 55%. Sales of vegetables will increase by over 100%, fruit 260%, citrus fruits 100%, and melons 110%.

A considerable part of the foodstuffs will reach the co sumers through public catering establishments. The extensive development of public catering not only saves social labor, but also greatly eases the work of women in household and creates conditions for their active partic pation in production and public affairs. In 1965, sales o public catering establishments will reach 103 billion rubles. Their output will more than double and they will serve meals totalling 27 billion courses. To make publi catering convenient and advantageous for the people, pla call for a substantial improvement in the quality of serv extension of the network of canteens, cafeterias, lunch counters, and a reduction in prices.

In view of the further advance of agriculture and the t mendous expansion in the output of synthetic materials a artificial fibers, the sales of major manufactured goods the population will rise substantially. Sales of fabrics will increase by 54%, clothing 94%, knitted goods 120%. The sales of footwear will grow substantially.

Still greater will be the rise in the sales of household goods and particularly articles which ease the househol work of women: washing machines, electric floor polis ers, vacuum cleaners, electric irons and refrigerators.

sharp increase in the sales of durable goods is a strik-
index of the advance in the people's living standard.
ne development of Soviet trade in the seven-year period
proceed on the basis of a substantial growth in the out-
of industry and agriculture. On the whole, the produc-
of consumer goods in industry will rise 62-65%, in-
ing approximately 50% in light industry and 70% in the food industry. Agricultural production will grow by about 70%.

The growth of agricultural production provides a solid basis for the development of the food industry. Industrial output of major food-stuffs in the seven-year period will be as follows:

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	1958	1965	1965 in percent of 1958
Meat, including first grade by-products, from state raw material resources (thousand tons)	2,863	6,130	214
Butter from state raw material resources (thousand tons)	638	1,006	158
Whole milk products (in terms of milk — thousand tons)	6,000	13,500	223
Granulated beet sugar (thousand tons)	5,256	9,250-10,000	176-190
Vegetable oil from state raw material resources (thousand tons)	1,225	1,975	161
Fish catch (thousand tons)	2,900	4,600	160

1965, per capita milk production in the USSR will be
466 kg. and butter 5.7 kg. Let us note for comparison
in 1957 the United States produced, per capita, 330 kg.
ilk and 4 kg. of butter. Thus, our country will consid-
ly exceed the United States in per capita production of
and butter in the next few years.

ne production of sugar per capita in the Soviet Union
amount to 41-44 kg. in 1965 as against 26 kg. in 1958.
consumption of sugar in the USSR per capita will grow
kg. and reach the level of consumption in the United
es. Production of vegetable oil per capita will rise to 10 kg. in 1965 as against 6.5 kg. in 1958. At the end of the seven-year period per capita consumption of fish products will rise to 13 kg. and exceed the consumption level in the United States. The requirements of the population in vegetables will be fully satisfied. In view of the substantial increase in the consumption of milk, meat and other products, the consumption of bread and potatoes will decline.

The Seven-Year Plan calls for a substantial increase in the output of manufactured goods. Production of major manufactured goods will be as follows:

	Unit	1958	1965	1965 in percent of 1958
Cotton fabrics	million meters	5,800	7,700-8,000	133-138
Woolen fabrics	million meters	303	500	165
Linen fabrics	million meters	481	635	132
Silk fabrics	million meters	845	1,485	176
Hosiery	million pairs	887	1,250	141
Knitted underwear	million units	398	780	196
Knitted garments	million units	97	160	165
Leather footwear	million pairs	356	515	145
Clocks and watches	million units	25	35.5	142
including wrist watches	million units	15	25	167
Wireless sets, radiolas, and TV sets	thousand units	4,900	9,302	190
including TV sets	thousand units	1,000	3,325	332
Sewing machines	thousand units	2,700	4,550	168
Cameras	thousand units	1,500	3,480	232
Refrigerators	thousand units	360	1,450	403
Washing machines and dish-washing machines	thousand units	538	2,570	478
Furniture	million rubles	7,600	18,000	237

The output of household goods will double and reach 88 billion rubles at the end of the seven-year period. In 1965 the population will have approximately 7.6 million refrigerators and 12.3 million washing machines. At the end of the seven-year period, for every three families there will be an average of two radio sets and one TV set. The production and consumption of electricity and gas for household purposes will rise substantially.

The consumption fund also includes the natural consumption of products received by people from their personal subsidiary plots. It should be noted that of late the share of these products in consumption is steadily declining. This is explained by the fact that, in view of the measures carried out by the Party and the government to advance the commonly owned enterprises of the collective farms, an ever increasing share of the income of collective farmers comes from the commonly owned enterprise. The number of collective farms which are going over to guaranteed monetary remuneration for the labor of their members is also growing; they are cutting or discontinuing completely payments in kind. This measure enables the collective farmers to buy for money everything they need. In the current seven-year period this form of labor remuneration will become widespread, which undoubtedly will lead to a considerable increase in the consumption of products bought through the state and cooperative trading network.

Social consumption funds are playing an ever increasing role in rasing the real incomes of the population. The growth of social funds, through which material benefits are distributed among members of society irrespective of the quantity and quality of expanded labor, is the communist way of raising the living standard of the people. It was pointed out in Comrade N. S. Khrushchev's report to the 21st Congress of the CPSU that "communist forms of labor, organization of production and such social forms of satisfying the requirements of citizens as public catering, boarding schools, kindergartens and nurseries are now being increasingly developed." The social funds are used for extensive measures of child upbringing, development of education, training of personnel, protecting the health of the population, maintenance of the disabled and aged, paid vacations and other payments and benefits.

To describe the role of social funds in raising the living standards of the people in the seven-year period the following figures may be cited. With the growth of the real incomes of factory and office workers by 40% per worker in the seven years, average wages will rise by 26%. The considerably faster growth of real incomes, as compared with the increase in wages, is determined above all by the rising share of social funds. Expenditures of the state for social services to the people will reach a huge sum, approximately 360 billion rubles in 1965, an increase of 67%. This is a rate of growth faster than that of the consumption fund as a whole.

The incomes of the population, formed ultimately as a result of the distribution and redistribution of the national income, go for consumption. These are the so-called final or real incomes of the population. Real incomes are the incomes of the population which ultimately are used by the population for consumption and accumulation. It must be said that in the studies of some Soviet economists the con cepts of real incomes of factory and office workers and real wages are often confused. Yet the index of real income is wider in scope than the index of real wages. Rea wages represent the quantity of material goods and services which factory and office workers buy for their nom nal wages; consequently, they do not take into account all the payments and privileges which factory and office wor ers obtain from social consumption funds. In calculating real incomes, account is taken not only of wages but also of all other benefits, including those that are received out of the social consumption funds. That is why the index of real incomes characterizes the final incomes, that is, the incomes which are finally used for consumption and partl for accumulation (individual home building, etc.).

Inasmuch as the index of real incomes includes income received not only in conformity with the economic law of distribution according to work, but also such incomes as pensions, allowances to non-working members of familie etc., it is more correct to calculate it on a per capita basis.

The rates of growth of the real incomes of the populati and the increase of the consumption fund practically coincide. On the whole, the consumption fund per capita will rise by approximately 50% in the seven-year period. Rea incomes of factory and office workers, per worker, will grow by approximately 40% on the average. Since the nu ber of factory and office workers will rise by 22%, the re incomes of all factory and office workers will increase b about 70% in the seven years. Real incomes of collective farmers will also rise by no less than 40%. The dynamic of real income per capita will coincide with the dynamics of the consumption fund per capita.

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To carry out the measures mapped by the 21st Congress of the CPSU for expanding and improving socialist production and advancing the living standard of the peopl it is necessary to mobilize all the reserves of the nation economy, and first of all the reserves for raising labor productivity. The targets for 1959-1965 call for a consic erable rise of labor productivity in all branches of the ec omy. It is to grow by about 55% in the entire national ec omy. This means that nearly 90% of the entire increase the national income is to come from higher labor productivity.

These figures show what a great part is to be played b the fulfillment of the assignments for increased labor pr ductivity. Mobilization of the reserves for higher labor productivity must become a primary task of economic co cils, planning agencies and local government and Party o gans.

Attainment of the optimal correlation between the consumption and accumulation funds, outlined by the Seven-Year Plan, creates the conditions for the continued powe ful advance of the national economy and the solution of th cardinal problems of communist construction: to build u the material and technical basis of communism, to accor plish the basic economic task of the USSR and to provide the Soviet people with the highest living standard in the world.

Voprosy Ekonomiki — No. 1, 1960

Kheinman:

me Economic Problems in Industrial Engineering*

ne importance of industrial engineering has repeatedly ı stressed in many Party documents dealing with the blems involved in the creation of the material-technical dation of communism. In the report concerning the tar- figures for the USSR's economic development for 1959- ;, the steady improvement of industrial engineering was d as one of the conditions for the creation of the materi- echnical base for communism. "The industrial engineer- problem represents a major part of all our ideological k at the present stage," said N. S. Khrushchev in his ech at the June 1959 Plenary Session of the Central nmittee of the CPSU.

dustrial engineering is an active factor in technical gress. The introduction of advanced forms of industrial neering is closely linked with technical progress and, at same time, exerts a considerable influence on the fur- improvement of the implements of labor and technolog- processes. Thus, continuous-flow production methods known to have played an important part in improving la- implements and manufacturing techniques. The devel- ent of these methods, in particular, has brought about ultitude of designs of handling devices which have come over an ever increasing share in the structure of fixed ts in modern industry. Moreover, a rational system of strial engineering increasingly determines the efficient zation of all the opportunities provided by modern pment and technology.

ne large-scale measures designed to accelerate techni- progress in the national economy which were carried y the Party and Soviet government in recent years, as as the June 1959 Plenary Session of the Central Com- ee of the CPSU which mobilized the Party and the workers dustry and science for the extensive introduction of round mechanization, automation and advanced technol- into industry, have provided for the steady growth of echnical level of production and for a more complete zation of engineering and technological resources for ing the productivity of labor. The struggle for accel- ing technical progress is being actively waged by mana- al personnel, Party and trade-union workers, by the en- working class of the country.

ne introduction of the most efficient forms of industrial neering is a paramount problem in the development of ern industry, in increasing the rate of production vth and, consequently, in winning time in the economic petition between socialism and capitalism. The latest ements of labor and modern technological processes not yield an adequate economic effect if their introduc- is not attended by corresponding improvements in in- rial engineering.

ne problems of industrial engineering acquire special ortance at the present stage, when the Soviet people are ing in practice the problem of attaining the world's est level of labor productivity. Gross industrial output in the USSR in 1957 was, according to the data of the Economic Research Institute of the USSR State Planning Committee, approximately 2 to 2.1 times less than that in the USA, while the number of workers in Soviet industry was 10% greater than that in the USA.

In the course of the Seven-Year Plan period the rapid growth of industrial output will be attended by a steady reduction in working hours. According to the data submitted by the Central Statistical Administration of the USSR, the duration of the working day at the beginning of 1959 averaged 7.4 hours, i.e., the working week was 44.4 hours. In 1960 all workers and offfice employees will be shifted to a 7-hour working day, and the gradual transition to a 30-35-hour working week is to be started in 1964. The increase in gross industrial output and the reduction in working hours as envisioned by the Seven-Year Plan can be carried out only if there is a sharp rise in the productivity of labor. In 1958, according to the USSR Central Statistical Administration, 16.2 million workers were engaged in industry. If the workers' labor productivity in industry were to remain at the 1958 level, then in 1965, with due consideration for the cut in working hours from a 44.4-hour week to a 35-hour week, the number of workers in industry would have to be $16.2 \times 1.8 \times \frac{44.5}{35} = 37$ million, or 20.8 million persons (2.3 times) more than in 1958. Even with an annual growth of labor productivity by 8% to 9% the number of workers in industry will have to be increased by 4 to 4.5 million. These data show the immense importance of the high rate of increase in labor productivity for the fulfillment of the Seven-Year Plan. At the same time, they illustrate the indisputable superiority of the socialist economic system, under which the rapid growth in labor productivity is accompanied by a steady increase in employment.

However, the opportunities for raising labor productivity by means of improving industrial engineering have not been made full use of until now. It should be noted that the economic problems of industrial engineering and the relevant opportunities for increasing industrial output and raising labor productivity are among those problems in industrial economics which are the least studied. A comparative analysis of the level of labor productivity in such key industries as iron and steel production and machine building in the USSR and the USA shows that, along with a slight lagging behind the USA in production techniques, the lower level of labor productivity in Soviet industry is due to the great number of auxiliary workers and to serious shortcomings in the organization of basic production processes. Thus, in the USSR's iron and steel industry the output per basic technological units — blast and open-hearth furnaces and rolling mills — is much higher than in the USA. However, the productivity of labor in Soviet metallurgical plants, according to the author's calculations, has reached but 60% of that at American plants. (1) This is due mainly to the following two factors. The first of these consists of drawbacks in industrial engineering and a certain lagging behind in the equipment level in some auxiliary processes at the basic metallurgical shops of Soviet plants. The average number of workers per furnace in the USSR is considerably

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ranslator's note: "industrial engineering" is used ighout as the equivalent of the Russian *organizatsie zvodstva.*

greater than in the USA. Consequently, though they have a lower productivity per furnace, the USA metallurgical shops produce approximately 17% more steel per worker than is produced per worker in the USSR. If we exclude the repair personnel who are included on the staffs of the basic shops, we find that the average output of steel per worker in the steel-making shops of the USSR is approximately at the level of the corresponding index for the USA. The second factor consists of certain shortcomings in the equipment and organization of auxiliary jobs. The average number of auxiliary workers per 1 million tons of annual steel output at Soviet metallurgical plants is approximately 2.8 times greater than at American plants.

According to 1945 data for the Republic Steel Corporation, the workers in the basic shops (without repair personnel) comprised 61% of the total, while auxiliary workers (including the repair personnel of basic shops) made up 39%. The corresponding ratio in 1958 at the Gary plant, the major American steel plant, was 71 to 29. In 1956 the workers (without repair men) engaged in the production shops of all metallurgical enterprises of the former USSR Ministry of Ferrous Metallurgy comprised only 37% of the total number of workers employed, while the number of workers in auxiliary shops (including the repair personnel of the basic shops) covered 63%. (2)

No fundamental changes in the ratio of basic production workers to auxiliary personnel in Soviet ferrous metallurgy have taken place in the period between 1956 and the present. The percentage of workers at auxiliary shops, including the repair personnel of the basic shops, in the total number of workers employed in the metallurgical plants of the USSR's entire ferrous metallurgy in 1956 equalled 63%. In the fourth quarter of 1958 this percenta for one of the biggest Soviet iron and steel works — a fo most enterprise as regards technical and economic indic — was 62.4. The share of repair workers equalled 27.5% and 31% correspondingly, and that of transport departme workers was 18.7% and 15.8%. Approximate calculations made by the author provide a more detailed picture of th share of the individual elements which make for the high input of labor in steel manufacture in the USSR's iron a steel industry, as compared to the USA. The greater inp of labor per unit of output in Soviet metallurgy, as compared with that in America, is accounted for to the exten of 40% by the greater number of repair workers and 38% the greater number of workers in materials handling departments.

It is difficult to make similar comparisons of indices t would characterize the industrial engineering level in ma chine building, since the data on gross output, on the util zation of the basic equipment and on the output of goods p unit of equipment-capacity are quite noncomparable. Th information available on the machine-building industry o the USSR and the USA for 1958 permits us to compare th number of workers per unit of basic metal-working equip ment (metal-cutting and forge-and-press machines) in th different branches. These data are presented in the foll ing table.

	USA	USSR*	USSR in percent of USA
Total machine building	2.11	3.62	172
Individual branches of machine building: tractor and farm machinery manufacture	1.69	3.44	204
Motor cars	2.77	2.91	105
Machine-tool and instrument manufacture	1.05	2.52	240
Power machinery production	1.27	3.28	258
Electrical machinery manufacture (without radio engineering industry)	2.46	3.94	160

* The data for machine building as a whole in the USSR are for 1958; the data on the individual branches are for 1957.

The ratios presented in this table should be corrected for differences in shifts in the machine-building enterprises of the USSR and the USA. If we take the number of workers per shift and correlate it with a unit of metal-working equipment, we shall obtain the following figures: USA — 1.59 and USSR — 2.50, i.e., 57% higher.

We use the index of the number of workers per unit of metal-working equipment for a comparative analysis of the industrial engineering levels in the machine-building industries of the USSR and the USA. However, there is no doubt that the degree of automation of production has a certain effect on this index. The approximate calculations that we have made, drawing on rough data for the share of automatic machine tools in the machine-tool stock of the USSR's and USA's machine-building industry, and on the assumption that work on automated equipment requires 1 to 1/3 of the workers required on conventional equipmen shows that due to the different levels of automation the nu ber of workers per unit of metal-working equipment in t USSR should be 5% to 11% greater than in the USA. The actual difference, however, exceeds 50%. This is due mainly to the fact that the level of specialization and the mechanization of preparatory operations in Soviet machi building is much lower and the share of auxiliary worke is greater than in the USA. Consequently, the principal causes for the greater number of workers, as compared the USA, at Soviet machine-building plants servicing a numerically equal equipment fleet, lie mainly in tcomings of an organizational and technical nature. e are some concrete examples.

ccording to the 1954 census there were 575,700 workers ged in the USA automobile industry. In 1958-1959 the ber of workers engaged at three Soviet automobile ts — the Likhachev, Gorky and the Moscow Small Auto- ile Plant — totalled 113,200 workers (3), i.e., 1/5 as y. The number of workers employed in the foundries e American automobile industry was 10,600 men, or of the total number of workers employed in automobile ufacture. The foundry shops of the three Soviet auto- ile plants employ 10,600 workers, or the same number e whole automobile industry of the USA, although the ut capacity of the American automobile industry ex- s that of the USSR by 12 to 14 times. The share of dry workers in the total number of workers in the So- automobile industry is 9.3%, i.e., 5 times more than in USA. The proportion of workers engaged in forge work r automobile industry is also quite high. The forge shops of American automobile plants employ 4,300 workers, i.e., 0.7% of the total number of workers. The number of such workers at the three Soviet automobile plants is 3,100, or 2.7% of the total number of workers. The share of forge shop workers in the USSR's automobile industry is almost 4 times greater than in the USA.

In 1954 in the entire machine-building and metal-working industries of the USA 2.2% of the total number of workers were engaged in foundries and 0.5% in forge shops. At 45 Soviet machine-building plants (employing a total of 192,000 workers) 12.4% of all the workers are engaged in foundry and 3.3% in forge shops. Thus, the share of workers engaged in the foundry and forge shops of our machine-building enterprises is 5.5 to 6.5 times greater than in American enterprises.

Quite detailed comparable data are available on the proportion of auxiliary workers in the machine-tool industries of the USSR, the USA and England (4) (see the following table):

	USSR		USA		Britain	
	total for 9 machine-tool plants	including a milling machine plant	total for 10 machine-tool plants	including the biggest plant	total for 11 machine-tool plants	including the biggest plant
Total number of workers including (in percent):	21,466	5,073	10,257	2,357	6,440	1,224
Production personnel	48.2	54.5	65.9	73.1	73.5	70.4
Auxiliary workers	51.8	45.5	34.1	26.9	26.5	29.6
Among auxiliary workers the following are engaged in:						
Repair and maintenance of equipment	9.4	6.9	3.8	2.2	1.5	1.3
Repair and maintenance of electrical equipment	2.7	2.5	1.2	1.3	0.8	0.7
Transport jobs	10.3	11.4	1.8	2.9	1.3	0.7
Storage operations	3.0	1.3	2.6	4.6	1.7	1.2
Tool management	8.7	8.8	3.0	1.7	3.1	3.3
Quality control	3.7	3.2	6.3	8.9	2.1	1.2
Other auxiliary jobs	14.0	11.4	15.4	5.3	16.0	21.2

may be gathered from the above data, the great num- of auxiliary workers in the Soviet machine-tool indus- s chiefly due to shortcomings in the organization of sport and materials handling within the plant, in the re- and maintenance of equipment, and in tool services. epair workers, materials-handling personnel, workers ged in tool services, and workers in quality-control ices make up two thirds of the total number of auxiliary ers employed in Soviet machine building as a whole. rding to data for 116 enterprises in different branches achine building, auxiliary workers made up 55.1% of the number of workers, of whom 25% were repair workers, materials-handling personnel, 13% tool-service men, .5% quality-control workers.

l that has been said above testifies to the vast reserves ncreasing output which are connected with organiza- l and engineering factors. The socialist economic sys- can and must provide for an immeasurably higher lev- industrial engineering than does the capitalist system. task is to make the fullest possible use of the advan- s offered by socialism in the sphere of creating the most adequate level of industrial engineering. This calls for carrying out a number of important economic measures and drawing the attention of all personnel in industry, of Party and trade union organizations, of engineering and technical personnel and of workers to the problems involved in industrial engineering.

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A fundamental improvement in the equipment and organization of work of auxiliary jobs at industrial enterprises is an important source for raising the productivity of labor in modern industry.

The functions of equipment maintenance and repair, manufacture of tools and implements, as well as of the work involved in the transportation and handling of raw materials, semi-finished goods and finished products, the quality and measurement control of the parts and goods manufactured, have become considerably more complex and larger in scope in the course of the first half of the 20th century.

All these jobs are carried out by a great army of auxiliary personnel. In 1958 there were more than 16 million workers employed in the USSR's industry, including 7 to 8 million auxiliary workers of whom some 3 million were engaged in materials handling, 2 to 2.5 million in equipment maintenance and repair (the personnel of repair factories, repair shops, and repair personnel at basic shops), approximately 0.5 million in tool shops of the metal-working industry, and about 0.5 million in quality-control services. The remaining auxiliary workers were employed at storage facilities and in servicing the planning and dispatching departments, etc.

A characteristic feature of modern industry is the specialization not only in the manufacture of different items, assemblies and parts, but also in a number of functions that are common for various branches of industry. Along with an increase in the number of production branches, a number of functions appear that are common for many branches. Almost all the labor functions performed by workers in the branches of the manufacturing industry may be classified into the following four principal functions:

(1) shape formation — transforming the object of labor from one state into another and imparting to it the shape required;

(2) handling and transportation of the object and product of labor from the storage to the production premises, between the shops and sections in the course of the manufacturing processes, and outside the production premises to the sphere of sale and consumption;

(3) control of the quality and quantity of the goods produced;

(4) maintenance of the implements of labor in working condition and their repair.

The second and the third groups of functions are acquiring an ever increasing number of common features in the different industries.

In machine building the manufacture of the chief implements of labor — machine tools and other technological equipment — has long ago developed into individual, intensively growing branches. At the same time, the production of all kinds of implements for this equipment — all sorts of conventional and special devices — has not yet become specialized to the extent that would transform them into individual branches. The result is that the continuously growing demand for implements is, as a rule, met by the tool and press shops of the machinery plants themselves Approximate calculations show the output of tools and implements by specialized plants in 1958 in the USSR to hav been 1/9 of that produced by the tool shops of machine-building plants (in value terms).

Until recently the development of world engineering pr ceeded mainly along the lines of creating and improving the systems of machines that performed the principal te nological functions. The equipment and organization of t processes involved in handling, quality control, equipmen repair and maintenance was being improved at an immeasurably slower rate. Thus, along with the intensive velopment of the machine-building sectors that supplied t basic technological processes in all production spheres, lag appeared in the production of means for the technical equipment of such large-scale spheres of labor as handli and transportation, quality control, repair of implements of labor, etc. It was the lagging behind of the technical means and organization of auxiliary functions that broug about the immense increase in the number of auxiliary p sonnel.

It should be noted that in recent years certain changes may be observed in the development of machine building the USA which contribute to an elimination of these dispr portions in technical progress. According to data of the Bureau of the Census, there were 105,000 workers employed in 1957 at enterprises manufacturing metal-worki equipment, and 119,000 workers at enterprises specializ in the manufacture of tools and implements for this equi ment. In the USSR 103,000 workers were employed in 19 at machine-tool plants, and only 42,000 workers in the to and instrument-making industry.

There is also a considerable lagging behind in the provision of the Soviet metal-working industry with handling and hoisting equipment and conveying mechanisms. This is borne out by the following census data on the equipmen at the disposal of the Soviet and American machine-buil industries:

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	USSR	USA	
	1958	1953	1958
For each 100 units of metal-working equipment there were:			
Overhead and gantry cranes	2.37	2.37	n.a.
Hoists, including crane beams	1.66	8.37	n.a.
Truck-mounted cranes	0.45	0.28	0.19
Mechanical loaders	0.44	3.83	3.50
For every 100 workers there were:			
Overhead and gantry cranes	0.68	0.98	n.a.
Hoists, including crane beams	0.48	3.48	n.a.
Truck-mounted cranes	0.13	0.11	0.07
Mechanical loaders	0.13	1.59	1.38

Thus, the provision of Soviet machine building with overhead and gantry cranes is not inferior to that in America, and even superior insofar as truck-mounted cranes are concerned. But American machine-building plants are provided with all kinds of hoists and, in particular, with mechanical loaders (including truck loaders) to an extent which exceeds by 5 to 8 times the corresponding indices for Soviet machine building.

Spare parts and assemblies for machine tools, machi and mechanisms, made at specialized enterprises, accou for 10% to 20% of the output of the chief branches of mach building in the USA. In the USSR spare parts are produc on a large scale only by the automobile and tractor indus try and by farm machinery enterprises. Spare parts an components for the greater part of machines and equipm

produced in a decentralized fashion, in very small
hes, or even by the piece, at the repair shops of the en-
rises in which the given equipment is in service. With
organization, the spare parts are frequently produced
non-standard materials, without conforming to tech-
gical requirements and at high costs, and their quality
nsatisfactory.

ne inadequate technical equipment of the handling and
ity-control processes in the USSR has made it neces-
y to employ 3 to 3.5 million workers in these jobs, which
mostly done by hand. It is only the largest enterprises
:h produce, from time to time, one or another type of
erials-handling mechanism or quality-control device.
sufficient specialization in the manufacture of tools,
lements and spare parts, components and assemblies,
vell as of other means for the technical equipment of
ir work, has led to the development of this kind of pro-
ion in a multitude of primitively organized repair and
shops of industrial enterprises which absorb vast re-
rces of labor, equipment and materials. More than one
of the country's entire stock of metal-cutting machines
mployed in the repair of all kinds of equipment (indus-
, building, transport and farm machinery) and in the
entralized non-specialized manufacture of tools and im-
nents. It is due to the decentralization of repair work
according to data for 1958, only 58% of the entire
k of metal-cutting machine tools was in the USSR's
al-working industry (including repair and instrument
os), whereas the corresponding figure for the USA was
. (5)

ne level of industrial production attained by the USSR
the prospects for its further development under the
en-Year Plan urgently require the creation of a power-
highly specialized industry producing implements,
e parts and assemblies for equipment, as well as
ns for mechanizing materials-handling and quality-con-
operations. These tasks cannot be solved by simply re-
nizing the specialization of the individual shops at in-
rial enterprises. It is essential to build specially
pped new plants for these purposes and to re-equip the
ting enterprises.

discussing problems involved in the setting up and de-
pment of specialized production of handling-and-hoist-
machines, spare parts for equipment, and of the produc-
of the non-basic technological equipment in general,
often meets with the objection that these measures will
ire heavy capital outlays that are needed for the devel-
ent of the chemical and other leading branches of indus-
This argument is quite untenable. The data we have
l above show that the number of auxiliary workers in
stry totals 7 to 8 million persons, and that approxi-
ely 1 million metal-cutting machine tools are used in
repair of equipment for all the branches of the national
omy and in the decentralized manufacture of tools and
ements for metal-working equipment. Consequently,
half of the workers of our industry and a stock of ma-
e tools equal to that which services the basic produc-
of the country's entire metal-working industry are di-
ed from the basic production operations and are not
in the manufacture of process equipment. It should be
l that the machine tools which service auxiliary pro-
ion are much less intensively utilized than the equip-
t in basic production. Designing organizations con-
e to follow the policy of setting up repair and tool shops
ch plant with an immense machine-tool fleet, which
rally involves heavy capital investments. If this were
nized in another manner, these resources could be
ed with a greater effect to the establishment of specialized enterprises concentrating on the manufacture of implements for auxiliary production processes. Thus, it is the existing practice of building repair and tool shops at the individual enterprises which involves an ever increasing diversion of production capacity and skilled labor from basic production activity. The creation of specialized enterprises for the production of technical equipment for auxiliary operations will provide for a more efficient utilization of capital investments.

Of course, the organization of a powerful industry specializing in the production of equipment for the mechanization of auxiliary operations, tools and implements, spare parts and assemblies for equipment repairs is a gradual process. It will be possible to make the resources of equipment and labor, which are now employed in the enterprise's auxiliary operations, available for basic production activity and to reduce the capital investments allotted for the creation of auxiliary shops at industrial projects, only as the specialized output of technical equipment for auxiliary operations develops. However, the development of this kind of output should be started without delay, for with the steady increase of industrial production the losses due to the faults in present-day industrial engineering are bound to grow in scope.

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The creation of an industry for the manufacture of equipment for mechanizing auxiliary production processes is an important, but not the only, prerequisite for reducing the share of auxiliary personnel in industry. Fundamental improvements must be made in the organization of auxiliary operations.

The mechanization of auxiliary operations will in itself not eliminate the previous auxiliary processes, but it will substitute mechanical work for manual labor. At the same time, it should be borne in mind that the mechanization of all existing auxiliary operations may lead to very complicated and expensive engineering solutions and not yield a proper economic effect. It is only a fundamental improvement in the organization of auxiliary processes, which would do away with or change the very character of many operations, that will make for a sharp rise in the productivity of labor. What is required is that a number of materials-handling operations should be eliminated, the distance which the parts travel should be shortened, the number of quality-control operations reduced, the order and location of equipment repairs changed, and the necessity of designing implements and tools anew whenever production shifts over to the manufacture of a new object should be eliminated. Only a decisive reorganization of the present management of auxiliary operations will make it possible to design processes which lend themselves to highly efficient mechanization and automation.

Let us examine the chief organizational problems involved in the most important auxiliary operations.

The raising of labor productivity in materials-handling operations calls not only for the mechanization of loading-unloading and other handling operations, but also for the elimination of a number of these operations, for shortening the route travelled by materials, assemblies and parts. The path actually travelled by materials, semi-finished goods, parts and manufactured items in most of our industrial enterprises is not being studied, nor is the duration of their travel and the actual input of labor and resources in handling operations being analyzed. Meanwhile, the estimation and analysis of these expenditures would permit us to bring to light major reserves for improving industrial engineering — cutting down the input of labor in handling, saving considerable time on the movement of items and on the inter-operational idle time of parts and assemblies.

This is closely connected with the problem of improving the layout and organization of shops and sections (both horizontally and vertically), of locating the basic and intermediate storage facilities, quality control points, packaging machines, etc.

American and British experts in industrial engineering problems maintain that "the study of materials-handling expenses brings us to the conclusion that it is this sphere which offers the greatest opportunities for cutting production costs and that it is here that great successes may be achieved quickly." (6) "There is no other factor that provides greater opportunities for cutting production costs and increasing efficiency than the improvement of materials handling," British experts write. (7)

The effective solution of the problem of intra-plant materials handling, which is a paramount problem in industrial engineering, calls for an all-round approach. The whole combination of materials-handling operations presents a single whole. The arrival of materials and semi-finished goods at the factory, their conveyance from the storage space to the shops for processing, their transportation from shop to shop and within shops from operation to operation, the transfer of the object of labor in the course of the production operation (feeding-in, positioning, turning and shifting, removal), and finally, the transportation of the finished goods beyond the production premises — all these are the main links of an integral handling process whose rationalization calls for an all-round examination and improvement of all the operations cited.

There is a whole set of important problems to be solved in the field of improving the equipment and organization of intra-plant railway transport. The major economic significance of these problems is determined, first and foremost, by the fact that they involve the labor of approximately 800,000 industrial workers (including loaders), and that the mileage of railway tracks in industrial enterprises is equal to 40% of the total mileage of all railway tracks in the USSR. They absorb almost one-third of all the locomotives in the country and their freight turnover, in tons, is six times greater than that of the total freight handled by the Ministry of Means of Communication (MMC). Despite the fact that railway transport plays an important part in the operations of many industrial enterprises, its equipment and management are in a state of neglect.

The intra-plant railway tracks, as a rule, are provided with second-rate, light-weight rails, low-quality ties, although in some branches of industry (ferrous metallurgy, in particular) these tracks are employed for a heavier rolling stock than are the tracks of the MMC. There are practically no diesel or electric locomotives used on the railway lines of industrial enterprises. The automation of block systems is inadequate or sometimes even absent on approaches with a heavy freight turnover (for instance, at metallurgical plants). The technical level of work on the repair and maintenance of tracks is rather low, too.

In the period of departmental industrial management many enterprises situated in the same location but subordinate to different ministries built their own parallel railway lines. The tracks, locomotives and handling facilities on such lines are used to a very small extent.

The heavy outlays for railway transport at plants and the great importance it has in the operations of industry call for extensive measures of technical reconstruction of such transport (strengthening of tracks, laying of new rails and ties, introduction of modern locomotives, especially diesel and electric locomotives, automation of block systems, improvement in the planning and mechanization of unloading points, etc.). Substantial savings are being derived from the work started by a number of economic councils to eliminate and unite the light-traffic railway tracks of adjoining enterprises, to concentrate the rollin stock and the handling facilities. Great economic effects may also be derived by shifting a portion of the freight from railway transport to other, more progressive mear of materials handling (continuous conveyers, pipelines, vibro-conveying, etc.).

The use of MMC railway cars now in effect and the sy tem of sanctions for the idle standing of these cars does not always contribute to cutting down the industrial ente prises' expenses on transport and handling operations. T non-uniform and poorly timed delivery of cars and the existing system of sanctions for delaying them in unload make the plants keep a great number of reserve loading personnel, which is great enough as it is (due to the inad quate mechanization of unloading work). Industrial ente prises sometimes unload the freight at intermediate poi so as not to keep the cars busy with unloading operation too long, and this requires their subsequent reloading.

It should be noted that in the USA the cars that are su plied by the general-purpose railways are marshalled directly up to the shops for which the given freight is de signed, the railways collecting a comparatively small su for the delay of cars on the industrial enterprises' track Such utilization of cars permits industry to reduce handl operations and storage areas considerably.

The relations prevailing between industry and the trur railway service of the MMC should, in our opinion, be r vised so as to avoid the useless labor-consuming reload ing of materials at industrial enterprises. The problem sanctions for the idle standing of cars should be treated differently for the different branches of industry by com paring the losses due to the somewhat prolonged standin of cars with the losses resulting from the additional rel ing, maintenance of reserve loaders, etc.

In order to cut down the sum total of expenses of trun railway transport and of the goods-receiving enterprise and to organize the transportation, unloading and storin of goods in the most adequate manner, it is expedient to up storage facilities at major railway junctions into whi the freight arriving by rail is to be unloaded. Then thes goods may be delivered by trucks not just to the plant th is to receive them, but directly to the shop for which th goods are designed. Such organization will yield a cons erable saving due both to a reduction of handling and storing operations at enterprises and to a decrease in t run of cars over approaches and their idle time as they are unloaded.

In the field of equipment repair, along with the proble of developing the specialized manufacture of spare part components and assemblies, there are a number of maj organizational and engineering problems as well.

The repair of equipment today, as a rule, is perform in a decentralized manner, by each enterprise proper. enterprise has neither extra spare parts, components a assemblies at its disposal, nor even the blueprints of th parts to be repaired, nor a properly worked-out repair technology. This makes the larger enterprises keep a comparatively large staff of engineers busy making blu prints and elaborating repair technologies. Despite the considerable outlays for this work, the technical docum tation for repair work is not drawn up in a sufficiently ified manner. At the small enterprises repairs are co ducted still more primitively, which leads to a shorter service life of the equipment.

The first thing to do in order to raise the level of re work is to make the machine-building plants provide th

oment they supply with sets of blueprints for each as-
bly and part that might be subject to replacement or
ir, as well as with a description of the repair work
nology. The design of the equipment must provide for
access to the assemblies that are subject to frequent
acement during operation, and render the performance
epairs as convenient and economical as possible. These
ures, combined with the organization of plants and shops
ializing in the output of spare parts and assemblies,
permit industrial enterprises to introduce the most
ressive aggregate methods of repair, to modernize the
oment in the course of repairs, to reduce greatly the
time of machine tools under repair, and to enhance
conomic efficiency of repairs.

ong with specializing in the manufacture of spare parts,
expedient to set up special plants and shops that would
entrate on the repair of certain types of equipment and
ndividual assemblies, and would possess a sufficiently
e stock of repaired mechanisms. The scale of Soviet
stry fully justifies the establishment of a special branch
dustry engaged in equipment repairs. The profile and
nal territorial distribution of the enterprises of this
ch should be determined. If there is a sufficiently
e stock of repaired machines available, the repair en-
rises will be able, as soon as a machine arrives for re-
s, to issue to the customer an identical machine in good
ing order. The repair of heavy, particularly complex
unique equipment may be performed by special travel-
repair teams on the spot. The ultimate task is to have
nterprises which operate the equipment perform only
naintenance and current repairs.

nultaneously with solving these major economic prob-
of the management of repairs, it is essential to re-
the extreme decentralization of repair work within the
rprises themselves. Thus, for instance, of all the
ters engaged in the maintenance and repair of plant
oment at the Gorky and Moscow Automobile Plants, only
t one-third are employed in the repair shops, while two-
s of all the repair personnel (including repair fitters
uty) are concentrated in the repair groups of the basic
s. Such an organization of repair work at enterprises
rs the labor productivity of the repair personnel.

ere are also important organizational problems to be
ed in the field of improving the quality control proc-
s. First of all, the responsibility of the workers and
men for the quality of the goods they produce should be
ed, and the army of intermediate inspectors of all de-
s should be reduced. This issue was raised as far back as
Khrushchev's report at the 7th Session of the USSR
eme Soviet. Second, Soviet and foreign practice has
ed out mathematical spot-check methods of quality
ol which should be introduced to the greatest possible
ee. These methods make possible a transition from
equent rejecting inspection which, while rejecting the
tive parts, does not in any way prevent the repetition
jects, to the systematic control of the quality of the
s produced. This will transform quality control into a
important means for improving the entire production
ess. (8)

course, neither the total inputs of labor by the mil-
of auxiliary workers, nor all the hundreds of machine
that are diverted from basic production to service
oment repairs and the decentralized manufacture of
and implements, should be regarded as losses due to
ts in industrial engineering. Industrial enterprises
have well-equipped tool shops making complicated
al implements, chief mechanic's departments which
out the modernization of equipment and the technical
re-equipment of the enterprise. The larger plants can and should have experimental shops. However, the greatest part of the machine tools used in auxiliary operations today are not used intensively enough to make standard spare parts for equipment and standard tools. The centralized and specialized manufacture of spare and repair parts and components of equipment, tools and standard implements, as well as the setting up of a network of specialized repair enterprises, will require immeasurably smaller inputs of machine-tool operation time, and thus a much smaller stock of machine tools.

There should be a definite staff of auxiliary workers who are engaged in setting the equipment (in fact, they may be justly included in the staff of basic production workers), in machinery maintenance, in making experimental and special implements, in issuing and keeping the tools in good condition, in quality control, in materials handling and storing operations, etc. However, with the proper technical equipment and the rational management of auxiliary services, all these categoires of workers should make up but a small fraction of the current 7 to 8 million-strong army of auxiliary workers. Most of these can and must be used in basic production.

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There are great possibilities of improving industrial engineering in the basic production shops of industrial enterprises as well. In the industries in which continuous production processes predominate, such as metallurgy, chemistry, oil refining, paper-making, power stations, etc., these possibilities involve the reduction of the number of workers servicing the basic technological plant down to the level which has been actually attained at the foremost Soviet enterprises. The other industries are faced with the task of introducing production-flow methods of industrial engineering on a large scale.

An analysis of data for a number of major metallurgical plants shows that the number of workers differs greatly for identical production sections. Thus, the average staff of workers per furnace at comparable blast-furnace shops of the USSR's six largest iron-and-steel plants varies within the range of 1 : 1.7. If the staffs were established at the level attained at the foremost Soviet plants, labor productivity would be substantially raised.

In the second group of industries, those in which technological processes are intermittent and the prevailing type of production consists of piece goods, technical progress creates specific conditions for solving the problem of introducing production-flow methods on a large scale. In branches characterized largely by mass production, the progress of technology is expressed in an increasingly frequent change of models and designs of the objects produced. As a result, the time within which the given goods are produced is shorter than the service life of the equipment, which is frequently made especially for the output of a given type of goods. It is the nature of the objects produced which complicates to a great extent the introduction of production-flow methods in small-serial and piece-goods production, which still prevails at most of the enterprises of the modern metal-working industry. At the same time, the goods made in these branches are subject to a similar and even more frequent change of models and designs. In these conditions the introduction of production-flow methods calls for, first and foremost, more extensive unification and standardization of the goods, assemblies, parts, equipment, implements, and technological processes involved

The June 1959 Plenary Session of the Central Committee of the CPSU has set the task of fundamentally improving the work involved in the standardization and unification of interchangeable goods, assemblies and parts. Improved industrial engineering also calls for the standardization, unification and consolidation of equipment. There arises the problem of creating readily readjustable and easily modernized general-purpose devices for equipment, as well as for the typification of technological processes.

Although many of our plants have scored considerable successes in unifying, standardizing and typifying the parts, assemblies and technological processes, still all these progressive forms of preparing and organizing production have been introduced to an insufficient extent and do not yet cover many types of goods.

Single-item and multi-item continuous and intermittent production-flow lines which operate efficiently in small-serial and even piece-goods output are already functioning at a number of foremost Soviet plants. Nevertheless, despite the high economic efficiency of production-flow methods, proved by practice, they are being introduced quite slowly as yet, and mostly at mass-production enterprises at that. The number of production-flow lines in industry, in particular in machine building, is still quite small.

The introduction of a progressive structure of production shops and sections is an important means and prerequisite for the large-scale introduction of production-flow methods in industrial engineering.

Most of the shops and sections of machine-building enterprises are at present organized according to the technological principle. With such a structure, and with the broad assortment and many types of parts used at the technological sections, the specialization of equipment and personnel is quite difficult and sometimes even impossible, while the application of advanced technology becomes unprofitable and the introduction of continuous flow methods is hindered.

The practice of leading Soviet enterprises bears out the progressive nature of the establishment of production sections functioning according to the object principle, of closed-cycle object sections in particular. Such shop and section organization considerably reduces the path travelled by the objects, cuts down the input of labor and resources in handling operations and the duration of the production cycle.

The organization of object production sections involves a number of difficulties, too. The concentration of all the types of equipment essential for the processing of the given items may occasionally lead to the individual equipment units being used below their full capacity, to the engineering, technician and foremen staffs being obliged to deal with a considerably wider range of technological processes, etc. All this calls for a careful choice and grouping of the objects and parts that are to be processed in the object sections, and for a thorough standardization of technological processes. These conditions will provide for uniform capacity operation of the entire equipment.

The number of object sections in industrial enterprises has increased significantly in recent years. Meanwhile, the opportunities inherent in this progressive method of industrial engineering are not at all adequately used. The organization of production sections according to the object principle and the extensive introduction of continuous-flow production lines acquires ever increasing significance in connection with the Party's directives to transfer to comprehensive production automation, since automatic lines represent object lines and their equipment must be arranged according to the continuous-flow principle.

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We have examined only a few of the major organizational and engineering possibilities in our industry. Many aspects of the problem have not been dealt with. Thus, it is well known that, due to shortcomings in industrial engineering, auxiliary processes still take too much of t basic production workers' labor. The point is that one-fi to one-quarter of the total working time of machine-tool operators is lost on these operations. The second group of losses includes the time wasted by basic production workers due to shortcomings in the organization of the b sic processes and in the management of the enterprise's auxiliary operations. Calculations show that 10% to 12% the total working time is lost due to defects in industrial engineering. Finally, the shortcomings in industrial engineering reduce the workers' labor productivity in thei basic production work. These losses include the loweri of labor productivity due to frequent resetting of the equ ment and to the great amount of time which the resetting machines takes, to the insufficient specialization of worl to the irregular provision of the work site with compone blanks, etc. The lowering of labor productivity of assem workers resulting from the uneven and incomplete suppl of units and parts for assembly work should also be included among these losses. The productivity losses involved in the low quality of repairs, the insufficient service life of the spare parts, tools and implements produced i decentralized manner should also be included here.

There are vast opportunities for increasing the produ tivity of labor by making use of the reserves involved i improved industrial engineering. The solution of the USSR's chief economic task may be considerably speede up if industrial personnel will consider the above-cited ganizational and engineering factors in the growth of lab productivity.

Footnotes

(1) Here and elsewhere the author presents his own c culations, drawing on data of the former USSR Ministry Ferrous Metallurgy and the Central Institute of Informa on Ferrous Metallurgy.

(2) Enlisting the services of specialized companies f performing some repair and handling jobs is one of the reasons for the smaller number of repair and materials handling workers at American steel plants. Statistical lications in the USA do not afford the possibility of defi the extent to which this practice is used. Judging by the dustrial census data of the USA, its quantitative scope should not be overestimated. Apparently, this method o performing repair and handling jobs is much more econ cal than the maintenance of the enterprise's own numer repair and materials-handling personnel at the plant.

(3) Only in basic production, without housing and mu pal services and auxiliary enterprises — quarries, logg plots, etc.

(4) *Metalworking Machine Tools*, 1953, pp. 18-19. D for the USSR include the Gorky Milling-Machine Plant (1959), the Moscow Krasni Proletarii Plant (1958), a seven other major machine-tool plants (data for 1956).

(5) The data for the USSR are supplied by the USSR tral Statistical Administration; those for the USA are t from the *American Machinist*, September 17, 1958.

(6) See the report of a team of British experts in ind trial engineering on their trip to the USA in 1953 — *Voprosy organizatsii proizvodstva v USA*, Foreign Literature Publishing House, 1958, p. 96.

(7) *Materials Handling in Industry*, London, 1950, p.

(8) A good definition of this new and broader approa to control has been given in the collective work, *Indust Engineering Handbook*, recently published in the USA. "Quality control is a system of checking, analysis and

(Continued on Page 62)

Voprosy Ekonomiki — No. 1, 1960

Feigin:

the Study of the Current Problems
Territorial Distribution of Productive Forces *

e 21st Congress of the CPSU advanced a number of
ficant problems concerning the territorial distribution
oductive forces and the development of economic re-
. These problems are of paramount importance both
e immediate future and for the entire period of con-
tion of the material-technical base of communism.
conomic effectiveness of capital investments, the use
ural resources, a new upswing in labor productivity,
eration of the expanded reproduction process, a rise
ing standards, and the consolidation of the country's
ses, all depend in considerable measure upon the
on of these questions.

e resolution adopted by the 21st Party Congress on
ade N. S. Khrushchev's report stresses the impor-
of a proper territorial distribution of productive
s in the current seven-year period: "Bearing in mind
precedented scope of construction envisaged in the
g seven years, and the need for securing a maximum
g of social labor and a gain of time, the proper terri-
distribution of the productive forces should be given
al attention."

e high level of development of productive forces, the
vements in science and technology, the discovery of
atural resources, and the changed structure of indus-
ctate a fresh approach to the problems of territorial
bution of the different branches of industry and the
pment of the economic regions.

materials of the 21st Congress of the CPSU disclose
egularities in the territorial distribution of socialist
ction which are conditioned by the formation and de-
ment of the world socialist economic system and the
ational socialist division of labor.

of the questions of special importance raised by the
Congress of the CPSU was that of the time factor in
stribution of new projects among the republics and
mic regions. Consideration of the time factor in-
s many aspects. Among them are the relative impor-
of expanding existing capacities versus the building
enterprises, the proportions between the construc-
f thermal and hydro-power stations, the order of pre-
ce in which the various mineral resources should be
ht under exploitation, the use of the latest achieve-
of science and technology, the peaceful uses of
c energy, etc. The role of the time factor must be
ally studied and methods devised to reckon with it in
on to the specific territorial distribution of the dif-
industries and the development of the economic re-

21st Party Congress posed new problems connected
he territorial distribution of the key branches of in-
and agriculture. This places a serious responsi-
upon the scientific workers and the planning bodies
ed with solving the problems of territorial
distribution of the productive forces. Particular emphasis should be placed on the closest contact between the experts working on territorial distribution and those scientists who are investigating the economic effectiveness of capital investments and modern technology. This is necessitated primarily by the need for raising the level of territorial planning, both along the line of distribution of industry and of the integrated development of the economic regions and interregional ties.

The efficiency with which the distribution of new development schemes on the territory of the USSR is planned does not meet present requirements. One of the causes of this disparity is the backwardness of research on the specific characteristics of the geographic distribution of the various branches of industry and their interrelations with the specialization and integrated development of the economic regions. Little has been done so far in the way of important generalizations from the long years of planning experience gained in this sphere.

The backwardness of scientific research and weak generalization of territorial planning experience have led to serious defects in planning the distribution of industry, and also in planning the specialization and all-round development of the large economic-geographical and economic-administrative regions. This results in cases of incorrect choice of regions and localities for new construction projects, in elements of voluntarism and local interests in the question of specialization and all-round development of some of the economic regions, industrial centers, etc.

Among the principal causes of the unsatisfactory planning of the distribution of new projects on the territory of the USSR is the absence of detailed general schemes of development and distribution of the most important industries and of scientific hypotheses on the all-round development of the economic regions for a period of 15-20 years. The absence of such general schemes and hypotheses leads to violations of the fundamental principles of socialist distribution of industry, to accidental and incorrect decisions which result in low effectiveness of capital investments and heavy losses in the national economy.

The existing division of the USSR into 13 major (basic) economic regions, dating back to 1939, has become obsolete and should be improved in accordance with the present development of the productive forces and the tasks of the Seven-Year Plan of development and distribution of the productive forces.

The backwardness of scientific research on this subject must be overcome if the level of territorial planning is to be raised. This applies first of all to the elaboration of scientific principles for the territorial distribution of the various branches of industry and agriculture in conformity with the conditions of transition from socialism to communism.

The decisions of the 21st Congress of the CPSU pointed out that those industries which should be given priority in

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nitted for discussion.

the different republics are those for which the most favorable natural and economic conditions exist. This will make for the most efficient use of the resources of each republic and economic region, for proper coordination of the interests of individual republics and the Soviet Union as a whole.

For this important national economic problem to be successfully solved, it is necessary to carry out a thorough and comprehensive investigation of the geographical distribution of each branch of industry and agriculture and of those objective requirements to which their rational distribution must conform, with an eye to the prospects for the new level of development of the productive forces, the basic direction of technical progress in the given and related branches, as well as the development of the international socialist division of labor. At the same time, the natural and economic conditions in all the republics and economic regions must be studied and correctly assessed as a highly important condition for the most effective development of the corresponding branches of industry. Unfortunately, these problems, despite their growing urgency, have been very inadequately investigated and have in fact received very little attention in our economic and geographical literature.

Examination of the specific characteristics and factors in the distribution of each branch of industry and agriculture and the various forms of transport and their influence upon the specialization of different types of economic regions is of considerable practical and theoretical importance. In studying the particular features of the territorial distribution of the different branches of production, two aspects of the problem must be considered: first, the specific characteristics and factors of the existing territorial distribution of the given branch must be disclosed, and its advantages and drawbacks correctly appraised; second, it is necessary to determine what the most rational territorial distribution of the branch should be under present conditions, i.e., what objective requirements it must conform to, considering the prospects of construction of the material-technical base of communism. Only when these two aspects of the problem have been studied will it be possible to draw up valid recommendations for a more rational territorial distribution of the given branch with a view to the present and future development of the country as a whole and its individual republics and economic regions.

In view of the unprecedented scope of construction work, the rational territorial distribution of industry must be properly coordinated with the rational specialization and integrated development of the economic regions. This is of paramount importance as one of the essential conditions for increasing the productivity of social labor and accelerating the building of the material-technical base of communism.

The interrelations between the geographical distribution of the branches of the economy and the development of economic regions of different types become increasingly complex with the continued development of the productive forces. This is due, first, to the continued growth of the old industries, and second, to the emergence of new industries as a result of technical progress. The study of existing interrelations between the geographical distribution of the various branches of industry and the development of the economic regions, and particularly, of ways of improving these relations still further, constitutes a pressing practical and theoretical task. Unfortunately, these questions have not received adequate attention up to now on the part of our economists and geographers working in research institutions and planning organizations.

Few works have so far been written, especially major monographic studies, elucidating the major scientific principles of territorial distribution of this or that indu try with all its specific features. Thus, in the last two years the Economics Institute of the USSR Academy of ences has published only three monographs devoted to s entific principles of the geographical distribution of ind try. If we consider that there are hundreds of industrie in the country, three monographs is far too few. Scient are faced with the task of preparing a large series of monographs on the territorial distribution of the variou branches of industry and agriculture.

The study of the distinctive features and factors of di tribution of industry and agriculture in connection with specialization and integrated development of large econ ic-geographical and economic-administrative regions i considerable importance. An important role in the inve gation of this problem involves the relationship between general laws, principles and factors of distribution of s cialist production, since these important scientific conc are often confused in our literature. Yet, a clear under standing of the distinctions and relations between these cepts has a direct bearing on the theoretical principles the territorial distribution of socialist production.

The concepts of laws, principles and factors of territ al distribution of production should not, in our opinion, equated. The laws of territorial distribution are object interrelations, existing independently of our consciousn in the geographical distribution of enterprises and bran of industry, in the territorial division of labor, etc. Th are inherent in the socialist mode of production. The p ciples of territorial distribution are a result of the cog tion of objective laws and underlie the economic policy the socialist state in this sphere. As for the factors of ritorial distribution, they have a different content connected with the way in which different conditions (gener and particular) affect the territorial distribution of pro tion.

A number of factors participate in the territorial dis bution of the various branches of production: natural c ditions and natural resources, the specific technical an technological features of the given branch of production the economic-geographical position, transport facilitie etc. In the case of each individual enterprise, these ge eral conditions are given concrete expression dependin the local characteristics, the size of the enterprise, its specialization, the nature of its cooperation with other plants, etc.

It must be stated that the role of the various factors the territorial distribution of industries and individual terprises has been little investigated so far. This wor done, as a rule, by the designing organizations, each in own way, with a view chiefly to the interests of the part lar branch. Often this is done in a very simplified way One of the reasons for this state of affairs is that scien tific work on this important problem has been lagging hind.

Familiarity with the basic characteristics and factor of territorial distribution of the various branches of in try is essential not only for the designing and planning bodies but for the economic councils too, and can play effective part in combatting excessive concentration on cal interests.

In elucidating the relations between the geographical cation of production and the development of the econom regions of the USSR, it is necessary to proceed from t fact that the economy of any economic region consists interconnected enterprises of the respective branches industry, agriculture and transport, giving the particul region a corresponding role in the system of territoria on of labor, in the system of the national economy as le.

ctual fact, enterprises (the factories and mills, s and pits, power stations and crafts in industry, and ollective and state farms in agriculture) represent the ry cells which in their aggregate constitute the re- ive branches of the national economy and economic re- . Hence, a study of the fundamentals of the formation evelopment of the economic regions is impossible ut investigating the combination and interrelations of nterprises of a particular territory which constitutes onomic region. It is precisely from this angle that the tigation of the interrelations and specific features of orial distribution of the various branches of industry he many-sided process of development of the econom- gions within the system of the national economy should proached.

considerable importance is the classification of the mic regions according to their specific features.

e USSR, with its vast territory, has different types of mic regions. These types must be strictly differen- in connection with practical and scientific tasks. In rst place, it is necessary to distinguish between re- of different industries, economic-administrative re- , and large economic-geographical regions. It is these types of economic regions which should be given ity of investigation in connection with the specific fac- nvolved in the territorial distribution of the different hes of production.

e three types of economic regions named do not cover e types of economic territorial complexes in exist- They do not include industrial complexes embracing a of adjacent industrial centers, various types of agri- al zones, microregions in the form of separate lower istrative districts or groups of these, etc., which also considerable role in the development and distribution productive forces, in the development of the econom- gions of the three types indicated.

l another type of territorial economic complex is in rocess of development. Its importance is steadily ng. We refer to the large economic zones.

connection with the elaboration of the long-range 15- plan of economic development of the country, we con- it no longer sufficient to divide the USSR into a rn and eastern part, as was the case in the previous range plans. Considering the enormous scale of de- ment of the productive forces throughout the vast ter- of the USSR, it is necessary, in solving the major em of territorial distribution of the productive forces, gle out at least three large economic zones, without self-contained, however, and linked mainly along the of those branches which depend upon unique natural tions and natural resources. Each of these zones d embrace a group of adjoining economic-geographi- egions.

view of the great and complex problem the large eco- -geographical regions are called upon to solve in the e of the present seven-year period and in the period d this, there is a need for closer and more rational ration between adjoining economic administrative re- comprising the respective large economic-geographi- eas, which are destined jointly to solve common eco- tasks within the system of the planned territorial on of social labor.

he construction of the material-technical base of so- m, the creation of a second powerful coal and steel in the East and a complex of machine-building and plants in these regions was of paramount importance. To build up the material-technical base of communism, the creation of a third and fourth metallurgical base is required. This stems not only from the need to produce more metal in the country, but from its vast territory, the distribution of its resources of iron ore, coking coals, nonmetallic minerals, power, etc.

The groundwork for the third metallurgical base in Siberia and Kazakhstan is already being laid in the current seven-year period. In the more distant future the fourth powerful metallurgical base is to be created east of Lake Baikal, where extensive deposits of iron ore and coking coal are available. The construction of the third metallurgical base in Siberia and Kazakhstan is being accompanied by the creation of a great power base and a whole complex of other industries connected with it, especially power-consuming ones. The plants of the third metallurgical base will manufacture metals primarily for the various branches of the economy of Siberia and Kazakhstan, where extensive construction work is in progress and new machine-building centers consuming large quantities of metal will be created, in addition to those presently in operation.

The light and food industries and agriculture will also develop in the third metallurgical base concurrently with the development of heavy industry and the growth of cities. In this way conditions will be created for the establishment of a new great economic center of national importance in Siberia and Kazakhstan. In the more distant future another large economic center will emerge in the Trans-Baikal area and the Far East as a result of the exploitation of their natural wealth.

The setting up of three or four major economic zones in various parts of the country will be of great importance for the solution of the general problem of territorial distribution of the productive forces in connection with the construction of the material-technical base of communism, for territorial planning, for accelerating the process of reproduction and for the rationalization of the territorial production ties and improvement of the material-technical supply, for the all-round utilization of natural resources, for speeding up the circulation of material goods. Interregional cooperation between specialized establishments should be practiced, as a rule, within the boundaries of these zones. The economic relations between the large economic zones should be conducted on the most rational lines, being based in the main upon the unique natural conditions and natural resources of those zones. This does not rule out, of course, suitable cooperation between establishments in adjoining regions of adjacent zones. As a result, long-distance transportation of finished goods, raw materials, semi-manufactures and other materials involved in material-technical supply will be reduced to a minimum.

The setting up of large economic zones would be of significance in many respects. It would become important, in particular, in the rationalization of cooperation in machine-building, which is now carried out over too large a radius. As a result, transport expenses devour the greater part, if not the whole, of the savings obtained from the specialization of enterprises. Large economic zones will promote a more rational specialization of the metal-rolling mills, a development of the power industry, improvement of interregional ties, etc. In setting up large economic zones attention should also be given to the degree to which their territory has been mastered, the density of their population, etc. On this basis it appears reasonable to set up a large economic zone in the European part of the USSR and two zones in the Asian part.

The establishment of these large economic zones will take a great deal of time, but the conditions for the solution of this task in the future should be created during the next few years. A number of important prerequisites for the establishment of comprehensively developed large economic zones will be created in the course of the current Seven-Year Plan.

Thus, a new type of large national-economic complex will emerge in the process of construction of the material-technical base of communism.

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The laws of socialist territorial distribution of production, the practice of territorial distribution of new construction projects and cities, of specialization and comprehensive development of the economic regions, inter-regional ties, etc., can be properly investigated only through a more profound study of the general laws of territorial distribution of production and the development of economic regions characteristic of the socialist mode of production in the period of the comprehensive building of communism. Such an investigation can be fruitful only if a study is made of an immense amount of data, and there is a profound generalization of experience and the new tendencies embedded in the target figures of the USSR economic development plan for 1959-1965.

An investigation of the scientific principles of a rational territorial distribution of new construction projects presupposes a study, along with the general laws, of the specific characteristics of the location of the various branches of industry, agriculture and transport, of the totality of factors determining the territorial distribution of each branch under the conditions of extensive construction of the material-technical base of communism. Another factor of paramount importance is the elaboration of scientific methods of economic calculation in choosing the geographical location for the building of new projects in regions and points, and in deciding the most rational level of economic specialization in various economic regions and the optimal structure of production there.

The research institutes, including the Economics Institute of the USSR Academy of Sciences, should render a great deal of assistance in this respect to the planning and economic organizations. To begin with, the lag of economic science in this sphere must be overcome. For example, very little has been done so far to work out methods of computing the most rational location of enterprises from among a group of variants. Each designing organization does its own computing of variants without having any generally accepted scientific method to rely upon, and this puts the practical workers in a very difficult position. Our planning, economic and designing organizations are badly in need of a uniform methodology. Careful studies of the economic location of enterprises and investigations of interregional relations must also be carried out with the aid of the latest computing machines. Enormous possibilities undoubtedly lie hidden here.

In working out methods and estimates and using mathematics for an economic analysis of the most rational variants of locating new enterprises, attention should be given to the manner in which these problems are handled in other socialist countries, and a critical study should be made of the works of bourgeois economists in this field. While exposing the unscientific nature of the general principles of bourgeois plant location theories, critical use should be made of some of their features, especially as regards the application of mathematical and statistical methods for practical purposes. The subject of plant location is dealt with, in particular, by bourgeois "econometrics." Special works have also been devoted to it by representatives of so-called "spatial economics," August Lesch, Claude
Poinsard, Walter Izard, and others. The book by the A
ican economist W. Leontief, "Studies in the Structure o
the American Economy," devotes considerable space to
problems of plant location, particularly to the question
interregional connections. On the whole, these works a
based on the methodological propositions of vulgar poli
cal economy. However, the methods of concrete compu
tions and some of the equations may be of interest to u

While working out methods of economic computation
different variants for the rational distribution of plants
interregional relations, attention must also be given to
questions of economic assessment of the natural resou
drawn into national economic activity. We should, ther
fore, welcome the initiative of the Economics Institute
the Ukrainian Academy of Sciences in setting up a spec
department for the investigation of the economic value
the various natural resources and the order in which m
eral wealth should be used.

To raise the level of scientific research on regional
interregional problems, much wider use should be mad
the method of balances. The balance method of investi
ting the specialization and comprehensive development
the economy is not being sufficiently employed in pract
This method affords the possibility of revealing the int
relations between the production and consumption of go
by individual regions and on an interregional scale. Ex
sive use of the balance method is essential in improvin
the planning of the location of production by regions, an
planning of regional development. So far, this method h
been inadequately used in regional planning, this being
primarily to the fact that it has not been sufficiently de
veloped scientifically.

Another pressing problem is the investigation of the
tribution and most rational use of labor resources, the
principal productive force, by large economic areas.
importance of this problem is growing in view of the g
shifts in industrial location envisaged by the Seven-Ye
Plan and in the long-run future, and changes in the rat
urban to rural population.

While industrial expansion in the European part of th
USSR will be effected mainly by increasing the existing
capacities through reconstruction, extension and all-ro
mechanization and automation, in the eastern regions t
growth of industrial output will depend chiefly on the b
ing of new enterprises. In view of this fact the proble
labor resources will be solved differently in the west t
in the east, the latter having a shortage of labor at pre
This makes it necessary to study the balances of labor
sources in the large economic areas today and in the f
and to study methods of planned redistribution of labor
sources over the country and their most effective utili
tion.

At the same time a study should be made of the way
which the balance of labor resources develops in indiv
junctions and industrial centers. There are cases in w
the labor requirements of certain branches are inadeq
accounted for in the planning of the development of thi
that industrial center. Thus, industries employing mo
male labor (iron-and-steel and non-ferrous metallurg
coal, oil, and other heavy industries) are located in so
centers, and industries employing mostly female labor
instance, the big textile center in Kamyshin on the Vol
in others. All this affects the degree of rational utiliz
of available labor resources in the given industrial ce

A sample study on this matter carried out in Novosi
Region by the Institute of Economics and Organization
Industrial Production of the Siberian branch of the US
Academy of Sciences shows that there are considerab

rences in the degree of utilization of labor resources
in very similar regions. Examination of the causes of
situation makes it possible to work out scientifically
antiated recommendations for the most rational em-
nent of the labor resources in every part of the region,
tory and republic.

actically nothing has been done so far to work out cri-
for defining the development of the productive forces
e different economic regions and republics. Yet this
ion is of great practical and theoretical significance
nnection with the building of the material-technical
of communism. Obviously, in the course of our prog-
towards communism the development of the productive
s in the different parts of the country must be brought
r to a common level, insofar as this is possible, while
e same time preserving the advantages of the terri-
l division of labor, which will be further strengthened.
is inevitably poses the question of how the degree of
ing differences in the level of development of the vari-
conomic regions is to be measured, and how the opti-
level which they should reach in the future is to be de-
ined. The growing urgency of these questions makes it
nbent upon scientific workers to tackle them in earnest.
ere are also other questions connected with the terri-
l distribution of productive forces and the development
e economic regions which await investigation. Closely
ected with the study of the scientific principles of ter-
ial distribution of the different branches of industry,
ulture and transport and the problems of improving
istribution of the population and labor resources is the
tigation of the scientific principles of specialization
ll-round development of the different types of econom-
gions under the conditions in which the material-tech-
base of communism is being built.

e elaboration of these problems lags even more be-
the times than the investigation of the territorial dis-
tion of the various branches of production. Yet, the
Party Congress advanced a number of tasks in this
which are of vital importance to the building of the
rial-technical base of communism. The urgency and
se of studying the principles of specialization and
rehensive development of the various types of econom-
gions derive directly from the decisions of the 21st
J Congress on the further all-round development of
al resources, with due consideration for the need of
alizing the enterprises and improving their coopera-
eliminating irrational shipments, and carrying out spe-
zation in a number of branches of the national economy.
e Economics Institute of the USSR Academy of Sci-
s has now undertaken the study of the problem, "Prin-
s of Specialization and Comprehensive Development of
conomic Regions of the USSR." This theme is part of
ore general problem, "Development of Production and
mic Relations and Territorial Distribution of Social-
roduction." In accordance with the preliminary pro-
, the investigation will be carried out in three inter-
cted sections. The first section considers the general
and factors involved in the specialization and compre-
ve development of the economic regions. In the sec-
he general laws and factors are examined in the con-
conditions of the different types of economic regions.
attention is focused here on the study of the two large
mic-geographical regions, the western region of the
pean part of the USSR and the Angara-Yenisei region
e east. The study of these two regions is used to de-
ways of improving the specialization and comprehen-
development of the old regions (chiefly on the basis of
rials for the Western regions) and the newly developed
Eastern regions (chiefly on the basis of materials for the Angara-Yenisei region). The third section is devoted to the rationalization of economic ties through improvement of the specialization and comprehensive development of the economic regions. The investigation will be carried out through:

(a) analysis and generalization of the experience acquired by the economic councils and enterprises, the republic planning commissions and the State Planning Committee of the USSR in the specialization and comprehensive development of the economic-administrative regions and the large economic-geographical regions;

(b) study of statistical data on the structure of economic activity of the economic regions, the intra-regional and interregional relations, the balance accounts on production and consumption, the labor balances, etc., for economic administrative regions and large economic-geographical regions.

A great deal of attention is devoted to elaborating methods for deriving the economically most effective specialization of the economic regions and a rational combination of branches in the economic complex, as well as to elaborating methods of economic assessment of the different factors determining the specialization and comprehensive development of the economic regions, such as natural conditions, labor resources, technical progress, etc. One of the most important means of studying the specialization of the economic regions and their intra-regional and interregional relations will be the use of cartographical works.

For a deeper study of the basic economic regions and centers expeditionary methods of investigation will be used, which will also provide the opportunity for establishing closer contacts with the economic councils and industrial establishments.

The program of investigations will be carried out by the Sector on Location of Socialist Production of the Institute of Economics of the USSR Academy of Sciences in collaboration with the Siberian branch of the USSR Academy of Sciences, and the Institutes of Economics of the Academies of Sciences of the Belorussian, Latvian, Estonian and Lithuanian SSR's. The branches of the USSR Academy of Sciences and other local scientific bodies will also be drawn into this work.

It is desirable for all the Economic Institutes of the Academies of Sciences of the Union Republics and the respective departments of the branches of the USSR Academy of Sciences to take part in the work of solving the problems of specialization and comprehensive development of the economic regions. Work based on a single plan, conducted by a single method, and covering all the large economic regions, would be most effective from all viewpoints and would most fully meet the tasks posed by the 21st CPSU Congress.

Scientific work on the problems of territorial distribution of productive forces and the all-round development of the economic regions has lately been noticeably invigorated in all the republics. Special departments on the location of production have been set up at all the Economics Institutes of the republic academies and in most of the branches of the USSR Academy of Sciences. It is very important for these departments to be strengthened with scientific forces, since they constitute a link between the specialists in the economic, natural and technical sciences.

This problem of strengthening the contacts between economists, technicians and natural scientists in the academies of the Union republics and the USSR Academy of Sciences has not yet been fully solved. These contacts must be stimulated to the utmost.

(Continued on Page 62)

Mirovaia Ekonomika i Mezhdunarodnye Otnosheniia
No. 1, 1960

E. Varga:

Twentieth Century Capitalism*

It may appear highly presumptuous to attempt to present in a single paper the picture of 20th century capitalism. My only justification is that I have devoted more than half a century to analyzing capitalism.

Although less was known about the world at the beginning of the 20th century, it seemed bigger than it does today. Little or almost nothing was known about large territories of the globe: the whole of central Africa and South America, West China, the Arctic and Antarctica. The population of the globe was only one half its present size. On the other hand, the world seemed larger because information travelled slowly and travel required a great deal of time. The distance between Moscow and New York can at present be covered in 10 hours, whereas formerly this required 12 days and more. The tsarist Lieutenant Colonel Serebrennikov, who made an official journey to Bombay, left Tashkent on November 6, 1901, boarded a British vessel at Brindisi and arrived at Bombay on December 8 (1) after a journey lasting 33 days. The same trip can now be completed in a single day.

Imperialist capitalism was already dominant throughout the world, but the production forces were far below the present level. The overwhelming majority of the population was unskilled and illiterate. Infectious diseases and high infant mortality reduced the average span of life, and consequently the duration of working capacity.

Agriculture was the principal occupation. Even in the highly advanced imperialist countries (with the exception of England), the percentage of the population employed in agriculture was equal to or higher than that working in industry. In 1895 an equal number of men were employed in farming and industry in Germany, 8.3 million in each; agriculture, in addition, employed another 1.4 million men to whom farming was a side line. In the USA in 1900, there were 9.6 million workers employed in farming and 7.6 million (2) in the mining and manufacturing industries.

The land was tilled mainly by wooden ploughs, harvesting was done with the scythe and sickle, and threshing by hand or with the aid of draft animals. Steel ploughs were used only in Western Europe and the USA. Even in the USA, the pioneer in the use of agricultural machinery, the value of farm machines and equipment in use in 1900 did not exceed three quarters of a million dollars, while the total value of farm property was 20.4 billion dollars. No tractors, trucks or harvester combines were known then.

The level of productive forces in industry was much lower than today. The factories and mills were in the main the same as those described by Marx in Capital: steam boilers, transmission belts and working machines. Electricity had only begun to penetrate into production; almost all the electric power was used for lighting. At the end of 1899 American industry employed (in million h.p.): (3)

Steam engines	Internal combustion engines	Water power	Electric motors	All mechanical power
8.19	0.13	1.45	0.50	10.2

There was an average of 2.1 h.p. of energy and less tha 2,000 dollars of capital investment per worker employed in industry. (The average for other countries was apparently even less). The machines were more efficient, of course, than in Marx's days. But neither the so-called “ entific management” nor conveyor lines were yet in exis ence.

In US industry there were only 6 office workers for ev 100 people employed. Although the monopolies already played a dominant role, many of the capitalists were stil running their businesses themselves.

Steam engines and horses were the only means of land transportation. The aggregate power of locomotives in th USA was three times that of industry. Automobiles were be found only in the USA, where there were 8,000 of then in 1900. In England there was a law until 1906 prescribi that every automobile must be preceded on the roads by man carrying a red flag to ensure safety for pedestrians There were then as many sailboats as steamships on the high seas.

Even more primitive, compared with today, were the itary techniques. In principle, they differed little from t techniques of the Napoleonic wars: the same infantry ar with rifles (the Maxim machine-gun was already in exist ence but little used), the same cavalry and horse-drawn artillery.

To be sure, the rifles and guns had been improved ove their predecessors but no new types of arms were used. Sm less gunpowder and the field telephone were considered novelties. The armies still had no motorized transport, tanks or aircraft. As late as 1910 the British secretary war said in Parliament: “We do not think that airplanes will be of any use for war purposes.” (4) (The German began to build military airships-zeppelins which were li er than air, but they proved to be of little effect). Only navy had advanced considerably over the previous 100 years. But submarines were not yet in use.

The world's industrial output was about half the 1925 figure and one-sixth of the 1957 level. (5) The world's steel output amounted in 1901 to 31 million tons, or som kilograms per capita. Per capita steel output in the lea ing imperialist countries was about 150 kilograms, whil in India, China and other similar countries it was practi cally nil. Coal output was equal to one-half the present million tons. Oil output was very small — 20 million to i.e., as much was produced in a year by all countries

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* Paper delivered by Academician E. S. Varga at the meeting of the Economics, Philosophy and Law Division of the USSR Academy of Sciences on the occasion of his 80th birthday and the 50th anniversary of his scientific and revolutionary activities. [Translator's note: all citations from non-Russian sources are retranslated from the Russian.]

world as the USSR is now producing in two months.
ustrial output, as is still the case in the capitalist
today, was concentrated to the extent of 90% in
ern Europe and North America. This applies particu-
to the production of the means of production. But even
se countries industry did not play the dominant role it
at present. Out of the total national wealth of the USA,
ally estimated in 1900 at 88.5 billion dollars, 52.5 bil-
ollars fell to the share of land and buildings, 9 billion
s to railroads, 6.9 billion to articles of personal use
es, furniture, etc.), and only 2.5 billion to "production
inery and tools."
or productivity was far below the present level; how-
the data available are insufficient to make accurate
arisons. Despite low labor productivity, crop yields
stern Europe were high. In 1900 the average wheat
in Germany was 18.7 centners per hectare, and in Bel-
Holland, Denmark and England, still higher; but in
SA and Southern Europe the yields were below 10 cent-
per hectare.
general direction of foreign trade was on the whole
me as today. The West European industrial countries
e USA supplied the underdeveloped countries with in-
ial commodities and bought from them raw materials
odstuffs. England was the leading country of the
. Her foreign trade was twice as great as that of the
nd one and a half times as great as that of Germany.
the leading exporter of capital and exploiter of colo-
Britain had an unfavorable trade balance. German,
some extent, Japanese exports were beginning to
ze out the British. In 1900 Germany produced more
than Britain. However, to stress the low quality of
erman goods, England obliged the German firms to
"Made in Germany" stamp on them.
foreign trade still bore the earmarks of colonialism
e the comparatively large export of machinery (55
n dollars in 1900). The USA exploited mainly raw ma-
s and foodstuffs and had a substantial preponderance
orts over imports, which was used to pay dividends
terest on foreign investments in the USA. 75% of
ports went to Western Europe. Tsarist Russia's for-
rade had a similar structure.
hat period the capitalist market was a truly world
t. Goods, capital and labor travelled unhindered from
untry to another. Imports and exports were not
d by any embargoes, contingencies or quotas. Customs
were collected but competitive conditions were the
everywhere. The trade agreements, which were then
ded as a rule for 10 years, nearly always contained
st-favored nation" clause. This meant that any privi-
ccorded by one country to another in the trade agree-
automatically applied to all other countries which had
agreements with it. The only exception was the
es. The monopolies by various means secured privi-
market positions in their colonies. One third of the
h exports and one-half of the French exports in 1900
o their colonies.
ctically all national currencies were stable: bank-
had a safe gold coverage. Not only did gold serve as
money, but gold coins circulated in large amounts
with banknotes and paper bills. In the USA, for in-
, the amount of gold coins in circulation in 1900 was
illion dollars, while the value of all banknotes and
bills in circulation was 1,227 million dollars. In
ny the value of gold coins in circulation was double
banknotes. (6,7) There were no currency restric-
nywhere. Every capitalist was able to migrate free-
his capital to any country, to acquire real property
and set himself up in business there. Passports were required only in Russia and the Balkans.

The capacity of the capitalist market, compared with the volume of production, was much lower than today because a smaller share of agricultural production went to the market, and the peasants themselves made many articles for their own use (houses, bread, clothing, shoes, etc.).

The monopolies did not yet succeed in maintaining as high prices as they do at present. For instance, the price of bessemer steel in Pittsburgh, in dollars per ton, (8) was:

1887	1897	1902	1904
21.4	10.1	20.7	13.8

But, as V. I. Lenin showed in his work on imperialism, decay and parasitism were already quite manifest, especially in England and France. In England in 1900-1901, out of the 594 million pounds sterling subject to income tax, 60 million came from incomes from foreign investments. In France in 1901, more than one third of the budgetary appropriations went to pay interest on the national debt.

Nevertheless the role of the state in the capitalist economy was incomparably smaller than today. Apart from arsenals, and forests and railways owned by the state in some countries, the state had no other productive property. Its economic functions were practically limited to the levying of taxes and issue of paper money. It did not regulate either production or prices. Its most important function was the maintenance of "law and order" in the interest of the exploiters. The taxes levied by the state in those years were incomparably smaller than today. Government revenue in 1900 amounted to (in millions of dollars),

USA	Germany	Britain	France
600	550	700	760

But it must be remembered that the purchasing power of money at that time was about three times higher and the national income much lower than at present.

On the whole, the economy of capitalism after its emergence from the agrarian crisis of the 19th century was regarded by many contemporaries as safe and sound.

The dominant class which determined the policy of the imperialist countries was the monopolistic bourgeoisie, although the remnants of feudalism were still quite strong. Except for France, the USA and a few other countries, the states were ruled by emperors or kings, and by no means everywhere were they mere figureheads (as in England). In Germany, Austria-Hungary and Russia the emperors, relying on the armies whose command was subordinated to them directly instead of to the governments, were able to dismiss premiers and cabinet ministers, to issue decrees against the will of the parliaments, and to dissolve the parliaments. The administration, army, and diplomatic service were headed by representatives of the nobility. The parliaments had legislative powers in England, France and the USA but not in Germany and Austria-Hungary, not to speak of Russia. Suffrage was very limited. Considerable proportions of the workers, the rural workers especially, were denied the right to vote. The seats in parliament were occupied by aristocratic landlords, by representatives of the bourgeoisie, lawyers and a very few representatives of the skilled workers. (9)

The world was already divided among the imperialist countries. Economic development in Western Europe was most closely connected with severe privations and suffering for hundreds of millions of people in the colonies. The profits derived by the European colonialists from capital investments in the colonies were 2-3 times greater than the profits they were making in the mother countries. In the parts of the world where the climate was suitable for settlement by Europeans (Canada, Australia, East and South Africa), the European colonialists were exterminating the native population by armed force and alcohol, seizing the fertile land and herding the local inhabitants into reservations. To escape starvation the local population was forced to work for a mere pittance in the mines and plantations of the colonialists. Although slavery was officially prohibited, it was widespread in different forms in Africa, Asia and in the south of the USA. Armies of missionaries, who vigorously implanted Christianity among the natives, urged them to suffer exploitation without a murmur. The colonialists frequently succeeded in organizing armed detachments from among the natives and used them to suppress other peoples, such as detachments of Askaris or Senegalese.

The division of the colonies at that time (the result of a long process of historical development) did not correspond to the relationship of forces between the colonial powers. England ruled in almost one-half of the territory of the globe. Even so small a country as the Netherlands had big colonial possessions, while Germany and the USA (who at the end of the 19th century initiated an epoch of wars for the redivision of the world) had reached England's level in economic development, but had practically no colonies. Germany captured only those territories which England regarded as unworthy of her attention. The roots of the First World War were already there. Preparations for it were already in progress. Germany and France had large armies: 604,000 men in Germany and 570,000 men in France. The armies, particularly the officers, were held in high esteem. In Germany and Austria-Hungary anyone below the rank of lieutenant of the reserve was outside "society." In those days, as distinct from our own, wars or aggrandizement were openly extolled. Such slogans as "Drang nach Osten" in Germany and "gloire" in France were constantly kept before the public eye. In England the navy was glorified. Military expenditures even in those years were big, although compared with those of today they seem insignificant. In 1900 the USA spent 209 million dollars for this purpose, Germany 620 million marks. However, arms were comparatively cheap then and the soliders' pay miserably low. The beginning of the present age was marked by an assault of Britain, France, Germany, tsarist Russia and some of the other imperialist countries on China, (10) a war for the redivision of colonies between the USA and Spain, and the Anglo-Boer war.

The gulf between the rich and the poor was very wide. In England, the richest country of that time, in 1900 there were (according to Mulhall) 158,000 wealthy families with property valued at 6,361 million pounds sterling, and 6 million poor families with an aggregate property of 680 million pounds. In the same year one million people in England out of a total population of 41 million were officially classed as paupers. In the USA in 1900 4.9 million out of the 29 million persons employed were children between the ages of 10 and 15. At the same time there was a fairly numerous labor aristocracy in the imperialist countries, England in particular.

Half the population of the imperialist countries even consisted of wage workers. Germany in 1907 had (in m lions):

Employed	including	
	workers	office employees
26.2	14.3	1.6

France in 1906 had 20.7 million gainfully employed per including 10.2 million wage and salaried workers.

Working conditions were bad. The working week ave aged 60 and more hours. The working day in the iron and industry was 12 hours. In Russia in 1897 the working d limited by an act of legislation to 11.5 hours. In the A can clothing industry "before 1910 working time in most tories was officially fixed at 56 to 60 hours a week. In many 'outside' factories an 84-hour week was the rule. During the height of the season the men worked 15-16 a day, from 5 a.m. to 9-10 p.m., many of them being comp to take work home as well. Men long associated with t dustry said that they often remained in the shop for the night to save travelling time and expenses." (11)

The conditions of the farm workers were still worse Prussia the Junker landlords, on the basis of the Law Menials (Gesindoerdnung), were vested with administr and legal powers over laborers residing on their estat A laborer had no right to leave the estate or receive g without the landlord's permission. The Junker had the to try his laborers, fine them, evict them from their h and, as a representative of the government, to throw t into his own jail, etc. The gruesome conditions of the ers of the colonies hardly require description.

The factories and mills were unheated, poorly lighte had no ventilation. As late as 1914 an American bour author wrote: "The old factories and too many of the factories cannot boast of being an adornment of their borhood. Many of them resemble correction homes, p or barracks, huge, gloomy and repulsive, enveloping e thing around them in clouds of black smoke." (12)

The trade unions were still (with the exception of E land) very weak. In their relations with the employers workers were strong in those industries in which ther were numerous small shops, such as printing, building woodworking. In these industries the men often succe in forcing the employers to sign collective agreements national scale. But the workers were very weak in the heavy industries where the big capitalists behaved, as rule, on the basis of the "I am master of my own hous principle, refusing to recognize the trade unions and t workers' representatives or to conclude wage agreem with them; they dictated their own conditions to the wo without any written agreements.

There were numerous strikes even then, the unorga workers also participating in them. The number of wo taking part in strikes and lockouts in 1900 was (in thou sands):

USA	England	France	Germany
568	135	223	132

al-Democratic parties existed in most of the ad- l capitalist countries. Unlike the situation today, the arian revolution and socialism were proclaimed as imate aim in the programs of these parties and in the n speeches of their leaders. In practice, however, tivities of these parties were reduced to efforts to win meal reforms within the framework of capitalist so- There was not a single Social-Democratic leader in est who gave any thought to the practical aspect of the est of power by the working class, or raised the ques- the allies of the proletariat against the bourgeoisie; asantry as a whole were treated by these leaders as ers of food whose interests were antagonistic to the sts of the proletariat. Revisionism, which depended pport upon the labor aristocracy and the trade union ship, had already planted deep roots. (13) The basic s of the collapse of the Second International were al- manifest.

e of the revolutionary workers, aware of the untrust- ness of their reformist leaders, sought refuge in alism and anarchism.

V. I. Lenin, proceeding from Marx's teachings, ated in all its aspects a new theory of the proletarian tion as applied to the era of imperialism: a revolu- y party as the vanguard most closely connected with oletarian masses; the peasantry as the ally of the ariat, with the latter in hegemony; utilization of the dictions within the camp of the bourgeoisie for the se of securing temporary allies, unreliable though they e, etc.

he Right Socialists, too, the capitalist system of the eoisie seemed enduring, unshakeable and eternal, at ginning of the 20th century. But the germ of the gen- risis of capitalism was already in existence. The in- laws of capitalism were leading to an increasing- rper division of society, with a handful of capitalist tes at one pole and a vast army of proletarians em- in manual and mental labor at the other pole, for lative, and at times absolute, impoverishment of the ariat, constantly diminishing the number of people in- ed in the existence of the capitalist system and ever sing the numbers of the foes of capitalism. Uneven pment made imperialist wars for the redivision of the inevitable. The entire course of development was g inevitably towards the general crisis of capitalism.

On the Eve of World War I

last years of the undivided rule of capitalism were d by great scientific, technical and economic prog- Planck's quantum theory and Einstein's theory of ity created the prerequisites for modern atomic phys- lectric motors and internal combustion engines be- widespread. Production of oil went up from 20 mil- ns in 1900 to 51 million tons in 1913. Production of obiles increased from a few thousand to 485,000. Sci- management of production became a wide practice: rld's first assembly line was introduced by Ford in 1912. es and automobiles quickened travel.

was the period of the most rapid growth of world in- al production in peacetime ever observed in the 20th y. The index of industrial output (taking 1901-1913 as rew from 72 in 1900 to 121 in 1913, an average annual se of approximately 5%. Production of wheat went up 4 million tons in 1896-1900 to 106 million tons in Average crop yields per hectare went up in 1911-1913 tons in Belgium, 2.5 in the Netherlands, 2.4 in Ger- and 2.1 tons in England. More than 300,000 km. (14) were added to the railways of the capitalist world in 1900-1915, something without precedent either in earlier or later periods. In 1913 the Panama Canal was opened for navigation. The volume of world trade carried on by 33 capitalist countries increased from 18,800 million gold dollars (general turnover) in 1901 to 36,100 million in 1913, i.e., it almost doubled. (15)

With reference to this period V. I. Lenin wrote: "On the whole, capitalism is growing incomparably faster than before ..." (16)

Prices grew and the capitalists' profits were very high. Development, however, was very uneven. The United States and Germany were ahead of Britain. One of the factors behind the success of the United States was the immigration of more than 10 million people (chiefly energetic young people) from Europe. The struggle for markets and colonies became sharper. Although the population of the British colonies was three times as great as that of the colonies of all the other imperialist countries put together, and although England, in addition, had entrenched herself in the semi-colonies — China, Persia, Argentina, etc. — she sought to extend her colonial possessions still further. (17) Backed by her naval superiority and naval bases — Gibraltar, Malta, Suez, Aden — England dominated the Mediterranean Sea and the Indian Ocean. However, under the threat of Germany, England abandoned her policy of "splendid isolation" and concluded an alliance with Japan (in 1902); she also agreed with France on the division of a number of territories in Africa (1904) and with tsarist Russia on the division of spheres of influence in Persia (1907). England was preparing for a big war with German imperialism, which was menacing her.

The German bourgeoisie was greedily looking forward to the conquest of colonies. With a great blaring of trumpets it set up a Navy Society and published maps showing, as part of the German Empire, all territories with any German population (thus setting an example for Hitler). The Right Social-Democrats were helping the German bourgeoisie. The military and the Kaiser willingly supported it. Some foreign "incident" was provoked nearly every year (Agadir, etc.). But Germany was badly handicapped by British supremacy on the seas, and Germany imperialism therefore sought to capitalize on its military supremacy on land for the purpose of spreading the sphere of its domination, especially towards the East. A "Middle Europe" plan was drawn up, the construction of a railroad to Baghdad was begun — the German government was trying to convert the Ottoman Empire into its semi-colony. This German policy led to a rapprochement between England and tsarist Russia, weakened by the war with Japan and the 1905 revolution. The British bourgeoisie regarded the speedy build-up of the German navy as Germany's worst provocation. In 1914 Germany had 133 warships, including 37 battleships. She had 80,000 men in the navy and spent 200 million marks (18) a year on it. The threat emanating from Germany led to the formation of the Anglo-Franco-Russian Entente, while Germany formed the Triple Alliance. Outlines of the world war were taking on more and more concrete shape. "Small" wars were in progress. Italy captured Tripoli, the Austro-Hungarian empire seized Bosnia and Herzegovina, and Greece captured Crete. Next came the Balkan War, which led directly to the world war.

By this time the trade unions had gained considerable strength. Their membership in 1913 was (in millions) as shown on the table on top of the following page. (19) (These figures include various organizations which were not engaged in the class struggle.)

The trade unions grew considerably in this period, and

Germany	England	USA	France	Italy	The whole world	Women
3.7	3.3	2.5	1.0	1.0	13.9	0.9

yet the capitalists in the basic industries in all countries (with the exception of Britain) persisted in their refusal to "recognize" the trade unions and to conclude collective agreements. Especially uncompromising were the industrialists of the USA, where the open shop became a program of action for the big bourgeoisie in its struggle against the trade unions. In 1909 the coal mine owners told the miners' union: "We do not by any means recognize you as the miners' union, neither now nor at any other time. We recognize you only as representatives of those whom we employ." (20) Frick, President of the Carnegie Steel Corporation and later of the United States Steel Corporation, said: "Under no conditions will we have any dealings with the United Mine Workers as an organization. This is final." This stand was characteristic of the United States Steel Corporation until 1937. (21) The capitalists resorted to the dirtiest means, employing detectives to spy upon the workers, throwing bombs into union premises, hiring strikebreakers to defeat the strikes. What was at stake was not an abstract principle. In 1910 workers employed in closed shops worked 50 hours a week, those in open shops 60.5 hours. (22) In the steel industry the 12-hour day was regarded as "normal" even in 1914. In England and Germany the working week before the first world war was between 48 and 60 hours.

The introduction of the assembly-line system made labor conditions more intolerable. Even Ford wrote that "each worker performs a single constantly repeated operation ... Some of the operations are so monotonous that is it difficult to imagine anyone desiring to remain on the job long." (23)

Real wages in England and America were falling, according to bourgeois authors, for prices were rising faster than wages.

Differentiation was growing within the labor movement: the workers were becoming more revolutionary (the general strike in Belgium in 1902, the revolution of 1905 in Russia, bitter class battles in the USA), while the Social-Democratic leaders were deserting more and more openly to the side of the bourgeoisie (the entry of socialists into the bourgeois governments in France; and David, Herz, Kalwer, and particularly G. Hildebrand in Germany). (24) The centrists — the Austro-Marxists and Kautsky — covered up their opportunism by left phrases. In Russia the Social-Democratic Party split into Mensheviks and Bolsheviks. Under the pressure of the masses an anti-war resolution was unanimously adopted at the Basel Congress. The Labor Party leadership on August 6 came out with the demand for neutrality on the part of England. However, all the labor parties, with the exception of the Bolsheviks, capitulated before the bourgeoisie. The beginning of the First World War was marked by the bankruptcy and the disintegration of the Second International. In the words of V. I. Lenin, "opportunism has fully ripened, becoming over-ripe and rotting in a number of countries, fully merging with the bourgeois policy, as social chauvinism." (25)

First Stage in the General Crisis of Capitalism

The state of the dictatorship of the proletariat born in Russia was an entirely new factor; it strengthened the operation of the internal forces leading to the inevitabl collapse of the capitalist system as a whole. It became parent that the overthrow of the dictatorship of the bou geoisie was possible in practice, that the "ultimate ain was not something in the indefinitely remote future, th was within the reach of our generation, that the proleta can take possession of the productive forces and contr them without the bourgeoisie, while the bourgeoisie as class cannot exist without the proletariat.

The bourgeoisie grew aware of the danger presented labor thorughout the world, and particularly in the cou defeated in the first world war, the countries whose ar and other machinery of coercion had disintegrated as a sult of defeat; for the working people of the world migh follow the example of the Russian working class. The geoisie, therefore, mustered all its forces to save cap ism. The bourgeoisie did not succeed in overthrowing dictatorship of the proletariat in the Soviet Union by m tary intervention and counter-revolution, but it did succeed in keeping the dictatorship of the proletariat restricted for a quarter-century within the limits of the S viet Union, in ending the postwar revolutionary crisis.

How did the bourgeoisie succeed in this? It can bes seen in the case of Germany. The German bourgeoisie acted through the Right Social-Democrats, the betraye the working class, into whose hands it placed the gove ment — Ebert, Noske, Scheidemann, etc. It conceded t traditional demands of the working class for the eight-day, universal secret ballot, freedom of assembly and press, etc. It set up a commission headed by the rene Kautsky to prepare for "socialization." It raised the workers' wages. By all these measures the bourgeois a certain extent appeased the bulk of the working mass broke them away from the revolutionary vanguard, gai time to organize a new apparatus of coercion, and gra ally exterminated, in clashes which lasted 3-4 years, t most revolutionary section of the proletariat. The abs of a Bolshevik party facilitated the success of the Ger bourgeoisie. By similar methods the revolutionary cr was eliminated in other countries too. (26) Capitalism a reprieve for about a quarter of a century but its gen crisis became obvious.

The rate of growth of production in the capitalist wo dropped considerably.

Index of Industrial Production in the Capitalist World (1901-1913 taken as 100)

1920	1929	1932	1938
116	176	114	181

The average annual rate of growth approximated 3% moreover, this growth took place entirely in the first ade, which was marked by a temporary expansion of th capitalist market. This advance concluded with the d and longest crisis of overproduction, followed by a cy

t any upturns, by stagnation. (27) The bourgeois
nist Hansen wrote: "At the end of the interwar pe-
e real income per capita (in the USA, Great Britain,
ny and France — E.V.) was only 18% above that of
(28) This is less than two-thirds of a percent per

general crisis of capitalism also spread to agricul-
the majority of capitalist countries. The extraordi-
ar demand resulted in a great increase in the culti-
reas and in the harvests in the trans-oceanic coun-
it brought in its trail a general overproduction of
ffs which became exceptionally acute during the cri-
1929-1933. In the USA farmers began to receive com-
ion for reducing sown areas. In Holland and Denmark
ctions were placed on the production of livestock
ts, in France on the production of wheat, in Japan on
n Brazil on coffee, etc. Food was destroyed in colos-
ounts while people were starving in the hundreds of
ns. The decay of capitalism stood out in inordinately
elief. The agrarian crisis has since continued in
r less sharp form, owing to the contradiction between
g output and an insufficient effective demand.

same cause led to the development of surplus capaci-
industry, to chronic underutilization of capacity,
c mass unemployment, particularly during the closing
of that period, to employment in unproductive fields
ing employment in fields producing new values, and
s even to an absolute decrease of the latter in cer-
dustrial countries. The crisis of capitalism mani-
itself also in the practically universal abolition of the
andard, in the inflation and devaluation of currencies,
growth of parasitism, in the interest on the national
some countries, such as England and France,
ting to nearly half the national budget.

relationship of forces in the capitalist camp changed
y as the result of the First World War. Austria-
y fell apart, breaking up into a number of small
The Ottoman Empire was no more; Germany was
ned; France became the strongest power on land;
lost her position as leading world power; this posi-
s gradually passing over to the USA which, unlike the
an powers, profited considerably from the war, hav-
t only 57,000 men killed as compared with the mil-
ost by European countries.

the end of the war traditional isolationism in the USA
outward victory over the expansionist imperialist
of monopoly capital. Congress rejected the Ver-
treaty and the USA's entry into the League of Nations.
er, implementation of the imperialist policy continued
swing in the form of heavy export of capital and lead-
ticipation of the USA in European affairs (the Dawes
ung plans, the struggle against the Soviet Union, the
itation of Germany). Threatening a naval "arms
the USA forced Britain to agree at the time of the
sion of the Washington Treaty to a parity of naval
which ended Britain's age-old supremacy on the seas
tiated the recognition of the USA as the leading world
power. Furthering its economic penetration of all the American countries and converting them into its semi-colonies, the USA forced Britain to give up her traditional policy of free trade and to create a system of preferential tariffs in the empire.

The struggle against the Soviet Union increasingly became the keynote of the foreign policy of the capitalist powers. Fear of the Rapallo Treaty led France to form the Little Entente of countries situated between Germany and the Soviet Union. Britain was encouraging Hitler (notwithstanding the fact that she "recognized" the Soviet Union in 1924, under pressure from her working class), and in 1935 concluded a "naval agreement" with him under which Germany was given permission to build up a navy equivalent to 1/3 of British naval strength; she refused assistance to France when Hitler's troops entered the demilitarized Rheinland zone. And right in France the upper hand was gradually won by the policy which considered the struggle against the Soviet Union more important than the struggle against Germany. Thus, the ground was prepared for the Munich deal and for the second world war.

The First World War was conducted for a redivision of the colonies. After this war, the colonies of Germany and Italy were distributed, under the guise of fictitious "League of Nations mandates," between Britain (and her dominions) and France. The former Ottoman Empire (with the exception of Turkey, part of which was supposed to go to Italy and Greece) was also divided between Britain and France. Yet, notwithstanding the fact that the territory of the colonial system had grown (Italy's seizure of Abyssinia in 1935, Japan's seizure of Manchuria and of North and East China), the general crisis of capitalism was already leading to the internal weakening of the colonial system. The imperialists had to give up the idea of converting Turkey and Iran into their colonies. Inspired by the example of the Soviet Union, which emancipated the tsarist colonies, the people in the colonial countries intensified their struggle, creating a threat to imperialist rule. Proof of this was contained in the uprisings in Morocco, in Madagascar and in Egypt, and in the resistance movement in India after the Amritsar events. Prerequisites were ripening gradually for the general crisis of the whole colonial system of imperialism.

The revolutionary crisis after the First World War brought about a great upsurge in the strike movement in most of the capitalist countries. Seven million workers took part in economic and political strikes in Germany in 1920. The number of striking workers in England during 1918-1921 was almost two million as an annual average. The miners' strike in 1921 involved the loss of 72 million workdays. Big strikes also took place in France, Italy and the USA.

In the course of these struggles trade union membership greatly increased. According to the data of the International Labor Office of the League of Nations, the trade union membership changed as shown in the following table (in millions):

***

	Germany	England	USA	France	Italy	All capitalist countries
1906	2.2	2.1	2.0	1.0	0.6	8.0
1920	13.0	8.0	5.2	2.5	3.1	43.0*

* Includes about 3,000,000 members of "neutral" unions: Christian unions, American company unions, etc.

In the period of the stabilization of capitalism, the bourgeoisie launched an offensive against the workers, wresting from them a considerable portion of the concessions it was obliged to make during the revolutionary crisis. "Rationalization" signified much greater intensification of labor. Inflation nullified wage increases. In those countries in which the currencies remained stable the bourgeoisie resorted to direct wage cuts. The British Chancellor of the Exchequer cited the following income figures on June 24, 1925 (in million pounds sterling for the indicated fiscal years): (29)

	Profits and incomes of capitalists and professionals	Workers' wages
1920-1921	1271	945
1921-1922	1394	520

Any comment on this would be superfluous. In the USA, according to official statistics, the share of the propertyless classes (95% of the population) in the national income was 77.9% in 1920 and 74% in 1927. (30)

The gains in democratic rights were nullified in Hungary, Italy, Poland, Portugal, Germany and other countries. When fascist dictatorships were established in these countries, the bourgeoisie deprived the workers of all their rights.

The main reason for the loss by the proletariat of all the gains it had won at the time of the revolutionary crisis was the betrayal on the part of the right-wing leaders of the Social-Democratic parties and the trade unions, who split the labor movement (the workers' parties and trade unions) and collaborated with the bourgeoisie against the working class.

On the other hand, the activities of the Right Social-Democratic leaders directed against the interests of the working class accelerated the formation and consolidation of Communist parties in a number of capitalist countries during this period.

The period between the beginning of this century and the present was the most disastrous period in the development of capitalism. It was associated with the most destructive world wars in the history of mankind, with the extermination of millions of people, the destruction of colossal productive forces, of material and intellectual values. This period was marked by the origin of a monstrous ideology and policy of the most reactionary forces of imperialism — fascism, with its despicable racist theory, complete eradication of bourgeois democracy, suppression of the individual, persecution and wholesale murder of the progressive elements. Imperialism, its policy, its ideology have completely disclosed their barbarous countenance to the peoples of the world.

At the same time, this period witnessed the formation of a powerful socialist system which demonstrated within a short space of time its superiority over capitalism. Developing its productive forces, culture and the welfare of the people with unprecedented speed, it exerted a most beneficial influence on the destinies of the world. The birth and development of the socialist system led to the aggravation of the general crisis of capitalism, quickened the disintegration of the colonial system and created the possibility of preventing another world war, of strengthening peace among the nations.

Capitalism Today

The events during and after World War II are still fresh in the memory of people. I shall, therefore, confine m
self to an analysis of the distinctions between capitalis
the beginning of the 20th century and today.

The laws of capitalism have not changed, of course.
concentration of capital through accumulation and centr
tion, the growth of the organic composition of capital, i
creasing productivity of labor and intensity of exploitat
etc., operate as before. Nor have the class relationshi
changed within capitalist society. And yet the capitalis
world has changed considerably. The population of the
globe has doubled since the beginning of this century, a
the material productive forces of society are also cons
erably greater. Colossal progress has been made in s
ence and engineering. But although the volume of indu
production in the capitalist world is now approximately
times greater than at the beginning of the 20th century,
though production of food has grown by approximately
100% (31) during this period, and although with the pre
level of technology it would have been possible to prod
20-30 times as much, were the fetters of capitalism di
carded, hunger, poverty and fear of the future are still
widespread in the capitalist world. P. Hoffman, manag
the special United Nations fund for assistance to the un
developed countries, declared that "60 out of 82 memb
countries of the United Nations could be classed among
derdeveloped countries. In 1957 these sixty countries
were inhabited by more than 1,000 million people, and
average income at that time was, according to availabl
statistics, 120 dollars." (32) This amounts to 33 cent
day per capita of the population. Actually, however, th
working people receive only about 50% of this income,
remaining 50% being appropriated by the landlords, us
local and foreign capitalists.

The sharp difference between living conditions in the
perialist and underdeveloped countries is also reflecte
the fact that in the former the average life span is 65
whereas in India, or in South America, for example, it
only about 33 years.

However, hunger and poverty are characteristic not
of the underdeveloped countries. In the capitalist "par
dise," i.e., the USA, there were in 1954, according to o
cial statistics, 3.1 million families and unmarried peo
with an annual income of less than 1,000 dollars, whic
less than 3 dollars a day for a whole family. In view o
high rent and costly municipal services this means tha
such people lead a life of semi-starvation. This, too,
lot of millions of jobless people when their unemploym
benefits are stopped. And how many families live in h
and poverty in Italy (in the southern part of the countr
pecially), Spain and other countries? To this day who
continents are characterized by rural overpopulation.
It could be estimated that about 1,500 million people i
capitalist world live in poverty; and many among them
kept in a state of semi-slavery, as for example, the N
groes in the southern states of the USA, in South Afric
Kenya. "The world is still a place of need, hunger an
misery for an overwhelming part of the poor." (34) T
tensity of exploitation has grown. The working week i
somewhat shorter in the industrial countries, but the i
sity of labor has become incomparably greater, and t
work itself more monotonous and tiring.

The life of the working people in the capitalist worl
harassed by fear of the future: by fear of unemploym
fear of the capitalist, land owner, landlord, tax collec
by fear of the police, the gendarme and the bourgeois
and above all, by fear of war.

Why then does the majority of the population in the
talist countries still live in poverty, in spite of the

ndous growth of production capacities and produc-
The main reason, of course, lies directly in the
list system, in the nature of the mode of production
is based on exploitation, and the consequent antago-
mode of distribution. Concretely, this is expressed
following:
About 20% of the labor force works directly, or in-
ly, for war purposes, producing articles which are
ly useless to the people.
Owing to the growing organic composition of capital,
h greater share of society's working time than is
sary is spent on the production of the means of pro-
n.
In view of the concentration of wealth and incomes in
nds of the propertied classes, a larger share of pro-
n than before takes on the natural form of luxuries.
A great many workers are doomed to chronic unem-
ent.
The proportion of workers occupied directly in pro-
n has diminished noticeably. In some of the indus-
ountries it comprises less than 50% of the gainfully
yed population. There is a corresponding increase in
oportion of the working people who do not produce
w values. This category includes the vast apparatus
ence and the executive apparatus, people employed in
g, in trade and services. Twenty-nine million people,
nly 40% of the total labor force, were employed in
ry and agriculture, construction and transport in the
t the beginning of 1959.
Production capacities are used during the cycle to the
of about 50% on the average. Considerable tracts of
land are not cultivated in the trans-oceanic capital-
ntries. The government of the United States has
awn from the market 9 billion dollars' worth of "sur-
farm products. Agricultural products are very often
rately destroyed.
The productivity of labor is still very low in the un-
veloped countries, especially in agriculture, owing to
e of archaic means of production.
se are the main "concrete" reasons which are respon-
or the fact that the overwhelming majority of the popula-
the capitalist world lives in poverty. Capitalism
exist without poverty, without misery for the work-
ople.
this is proof of the thorough decay of capitalism,
of the fact that the material prerequisites for social-
d communism have fully ripened within the capitalist
n.
withstanding the identity of the internal laws govern-
pitalism, the position of capitalism in the world to-
much different from the position of capitalism at the
ing of the current century. The main changes are as
s:
Existing side by side with decaying capitalism, there
thriving socialist world which already embraces
than one-third of the globe (both as regards territory
pulation). The capitalist world contains within itself,
with the imperialist powers, not only colonies, semi-
es and dependent countries, as at the beginning of
ntury, but also a growing number of sovereign states
are hostile towards imperialism and which are de-
ng friendly relations with the socialist world.
cern for the preservation of the capitalist system and
uggle against communism have become the pivot of
alist policy and ideology. In its struggle against the
g masses, monopoly capital relies for support upon
e and the military apparatus, which has grown immeas-
and has acquired particularly reactionary features.

All the forces of reaction are mobilized for the struggle against the communists and against the ideology of communism, against the socialist world as a whole. The apparatus of violence persecutes the communists. Communist Parties have been outlawed in West Germany, Spain, Argentina, Greece and other countries. Persecutions are employed not only against the communists, but also against all progressives. Anyone who takes a stand against the monopolies or landlords is branded as a "communist." On the other hand, monopoly capital is endeavoring to allay the dissatisfaction of the working class by means of social welfare undertakings, distribution of corporation shares among the workers and employees, by sustaining a labor aristocracy within the working class, and, especially, a labor bureaucracy as its bulwark.

One of the main instruments of monopoly capital in its struggle against communism is the church, the Catholic Church especially. Christianity, which originated as a religion of slaves and the poor, has evolved into a bulwark of monopoly capital. Using its monstrous apparatus, its missionaries and its age-old traditions, the Catholic Church is fighting against communism throughout the world, even in the European people's democracies. This struggle is conducted more and more openly. The New York Times, the organ of big business in the USA, wrote with joy: "Pope John XXIII has forbidden all Roman Catholics, wherever they may be living, to vote for candidates or parties supporting the communists or sympathizing with them. This is the first Vatican interdiction concerning any candidate or party. The interdiction is absolute. It affects also those candidates and parties which profess to be Catholics. This was the first major act of Pope John XXIII affecting communism. It has shown that Pope John XXIII takes the same rigid stand on communism as his predecessor Pope Pius XII." (35) Cardinal R. J. Cushing, Archbishop of Boston, wrote in connection with the invitation to N. S. Khrushchev to visit the USA: "The invitation to the leader of the Soviet state to the USA is tantamount to the opening of our borders to an enemy at the time of military operations." (36) No wonder Catholicism is so widespread among big businessmen in the USA. (37) However, the Vatican's openly reactionary policy damages its influence among the mass of the people. Hence the bankruptcy of the ruling Catholic Party in France, the defeat of the Catholic Party in Sicily, where a million Catholics voted against the Vatican injunction, and the weakening of Adenauer's party.

In the struggle against the working people monopoly capital is using the right-wing leaders of the Social-Democratic parties, who are splitting the working class, weakening the labor movement and trying to gear it to the interests of the bourgeoisie. The Social-Democratic parties still represent a considerable force. On the eve of the Socialist International Congress in Hamburg in July 1959, the Social-Democratic parties had an aggregate membership of some 11 million and had mustered more than 60 million votes in elections throughout the world. (38) Under the right-wing leadership, the policy of Social Democracy is constantly drifting further away from Marxism, from socialism. In their new programs the Right Social-Democrats have rejected not only the "ultimate aim" and the class struggle, but even the bourgeois nationalization of the means of production. "The ancient enemy, capitalist exploitation, was accorded not much more than superficial mention," wrote the Times (July 20, 1959) with reference to the Hamburg Congress of the Socialist International, in July, 1959. The struggle against communism and defense of the anti-Soviet war policy of imperialism — this was the main line conducted at this congress. Even Bevan, in submitting to the congress a project of aid to the Arab countries, urged that this would be "a real defense against the spread of communism in the Near East." (39)

The resolution of the congress, in full accord with American imperialist policies, demands the "liberation of the peoples of Eastern Europe." Assembled separately in Hamburg, the Right-Wing Socialists ejected from the East European countries demanded: "Private property in land should be restored and guaranteed. Small and medium industries as well as retail trade should be left in the hands of private enterprise." (40) In short, they demanded the restoration of capitalism.

The anti-communist standpoint of the American trade union leaders who play the role of Right Social-Democrats in the realm of policy is generally known. They are spending annually tremendous sums (the money of the American workers) on the struggle against the communist movement all over the world. Their official pronouncements in no way differ from those of the late Dulles. The resolution on the merging of the AFL and CIO says, for instance: "The present struggle between the countries of communist dictatorship and the free world ... is a struggle between two antagonistic ways of life: democracy ... and communist totalitarianism with its sweeping program of conquest and alteration of the world ..." (41)

The right Social Democratic leaders are carrying out the will of the bourgeoisie so willingly (and it will often be found that they themselves come from families which belong to the big bourgeoisie, to mention only Attlee, Cripps, Gaitskell, Guy Mollet), that it has no fear of entrusting to them the administration of the country. It is a fact that for 25 years now, the Swedish Social Democrats have been forming the government, alone or in coalition with other parties, without any detriment to Swedish monopolist capital.

However, notwithstanding all the political astuteness of the reformist leaders, they find it increasingly harder to reconcile the proletariat to the capitalist system. In France, the Socialist Party has evolved into what is practically a purely petty-bourgeois party, both as regards its policy and as regards the composition of its membership and voters. In Britain it is becoming increasingly difficult to coordinate the policies of the left wing and right wing of the Labor Party.

It requires no proof that the struggle against communism has become the pivotal factor of the foreign policy of imperialism. Proof of this is contained in the existence of NATO and other military blocs, in the maintenance of air bases around the socialist world, in the military aid rendered by the USA to all the reactionary governments, in the production of ever more destructive means of warfare.

This policy has the approval of the right-wing Social Democratic leaders. The following words of Spaak, the General Secretary of NATO, could well have come from the pen of Mr. Dulles: "If it is impossible to achieve equilibrium by means of disarmament, then the equilibrium of fear is better than the absence of any equilibrium." (42)

The Secretary of Defense in the Labor Party "shadow cabinet," Brown, said: "Far from ... drawing us into war, NATO has in fact been perhaps the most powerful force in defending freedom from further aggression in Europe." (43)

The struggle against the socialist world has its effect also on the struggle within the imperialist camp. The internal laws of imperialism lead, as before, towards war. About a dozen "small" wars have been fought after World War II (Korea, Vietnam, Suez, Algeria, etc.). But concern for the preservation of the capitalist system, fear of the proletarian revolution following upon a military defeat and fear of a relative increase in the strength of the sociali world as the result of the mutual weakening of the impe ist powers, exert a restraining effect and prevent the g ing contradictions between the great capitalist powers from developing into wars. Although the penetration of American capital and the economic policy of the USA i jure the interests of England, and although she does not prove of the policy of the USA with respect to China an policy of France with respect to Algeria, England coor nates her foreign policy with the governments of these countries and of West Germany. In line with their reac tionary internal policy, French and West German mono capital are cooperating closely in the economic field ar the sphere of foreign policy. War Minister Strauss has disclosed that the FGR has placed in France an order f munitions to the value of 1,000 million marks. (44) Th Germans are cooperating in the production of A-bombs France. England and Germany have agreed to join in d signing a new tank. (45) Even Israel is supplying arm ments to Western Germany, despite the barabarous ext mination of millions of Jews by Hitler. Although the va majority of the population in the capitalist countries de sires peace, and although the proposals of the Soviet go ernment for complete disarmament formulated by N. S Khrushchev in his address to the United Nations Gener Assembly were received with great approval, monopoly capital, which is interested in military deliveries, and reactionary circles are doing everything for the contin tion of the "cold war."

The ideology of imperialism has always been reactio At the beginning of this century, however, there were s considerable remnants of the anti-feudal, liberal, radic ideology of the bourgeoisie. Today, however, the ideol of capitalism is thoroughly anti-communist: "freedom anti-communism; "defense of the rights of the individu is anti-communism; the social sciences, just as religi are defending and embellishing the rotting capitalism, perialism and the superiority of the white race, (46) slandering communism.

(b) The second new development is the disintegratio the colonial system of imperialism. Most of the colon have already become sovereign states, and the emanci of the remaining colonies is inevitable. The disintegra of the colonies has social and political causes at its ba in the field of armaments the imperialist countries hav never had such a preponderance over the colonies as a the Second World War. Nevertheless, the political em pation of the colonies does not yet end the colonial natu of their economy; only those former colonies which ha adopted the socialist course of development are rapidly shedding the colonial nature of their economy. Althou dustrial development has reached a certain stage in th former colonies, the economic gap between the industr imperialist countries and the underdeveloped bourgeoi countries remains to this day. According to the index industrial production for the capitalist world compiled the UN, the relationship between its specific parts pre the following picture (see table on the following page).

Moreover, a considerable proportion of the industria enterprises (old as well as newly built ones) in the und developed countries belongs to foreign capital. (48)

This notwithstanding, there is a fundamental differe in the relations between the underdeveloped and the im perialist countries today and in the prewar period. B the war the imperialists had a monopoly of the deliver of means of production to the underdeveloped countrie capital and credits, of the purchases of raw materials fro these countries and the deliveries of armaments to them.

Share of Specific Parts of the World in Industrial Production in 1953 (in %)

	Manufacturing industry as a whole	Metal-working industry
h America	57.6	64.0
tern Europe	32.0	30.8
remaining part the capitalist rld	10.4	5.2

this monopoly of the imperialist countries in the
es has collapsed. The Soviet Union and the other so-
industrial countries are now in a position to deliver
underdeveloped countries any means of production,
nce credits on more favorable terms than the capi-
to render unselfish technical assistance to these
es and to purchase raw materials from them.
underdeveloped countries are now able to determine
wn policy. Many of these countries are actively co-
ng with the socialist world, receiving assistance
ne socialist countries. (49)
e than this. The liberated countries can choose to-
ween the capitalist and socialist ways of development.
is pass over to an analysis of the changes within
ism.

Although the main classes in capitalist society are
ne as before, the differentiation within these classes
iderably greater.

e beginning of this century the working class was
sed in the main of two sections: skilled workers and
n laborers; a section of the skilled workers in the
alist countries (in Britain especially) belonged to the
ristocracy.

g to the prevalence of assembly-line methods of produc-
considerable section of the proletariat is composed
ined" workers today, while the importance and num-
skilled workers are relatively smaller. The role
nber of common laborers are also smaller, inas-
s in the industrial countries machines are perform-
re and more of the operations which require the use
muscular power. But a new, thin layer of highly
workers has come onto the scene, technicians who
the complex aggregate units of machinery. There
ch greater section of the labor bureaucracy (in the
nions, in the workers' co-operative societies, in the
st Parties, etc.) which supplements the labor aristoc-
litically and often steps into its place.

e is much larger number of salary earners. On
hand, this is the result of the expansion of the state
us and of the services which employ mainly salary-
s; on the other hand, the proportion of salary-earn-
compared with wage-earners, is growing in indus-
ng to technical progress (automation, electronics,
Thus, in the USA, the number of salary-earners out
y 100 gainfully employed people was 6 in 1899, 19.4
and 21.3 in 1954. (50) One-third of the total pay-
industry was made up of salaries in 1957. (51) In
d the number of office workers was, according to
data, as follows (in thousands). (See table at top of
osite column.)

equently, in the most advanced industrial countries,
nber of salary-earners is gradually approaching the
of wage-earners occupied in production. The more
rowth in the number of salary-earners, as compared with the number of wage-earners, is continuing.

1891	1911	1931	1951
414	843	1,465	2,124

This is a fact of great political significance. It is a fact, of course, that the overwhelming majority of the salary-earners are proletarians; their salaries are often lower than the wage of a skilled worker. But the highest paid sections of the salary-earners in the private companies tend to coalesce with the capitalists, while the high officers of the civil services and members of the labor bureaucracy play an important political role. Unlike the workers, the salary-earners can dream of advancement to the ranks of the bourgeoisie. Furthermore, they do not perform physical work; they belong to the "white collar" force.

The bourgeoisie is trying to capitalize on these superficial differences between the proletariat of the factories and the proletarians employed at the desk. (52) It tries to counterpose them. But increasing numbers of salary-earners join the trade unions and come closer to the workers' organizations.

Another process at work in the industrial countries is the decline in the number of people occupied in agriculture, the decline in the number of peasant farmers. The number of hired workers and members of farmers' families employed in agriculture in the USA was as follows (in millions): (53)

1909	1930	1945	1958
12.2	11.2	9.8	7.5

The decline in the number of people employed in farming is accompanied by the capitalization of agriculture with the great growth of fixed capital. While the number of people employed in agriculture has declined, production has grown considerably.

The same process is at work in other industrial countries, although its operation is slower. But it is completely absent in the underdeveloped capitalist countries. In these countries the number of people employed in agriculture increases along with the increase in population; a billion peasants are cultivating the land, in the main with the same primitive implements as at the beginning of the 20th century.

Considerable changes have also taken place in the ranks of the bourgeoisie. Numerically, it has drastically diminished, as compared with the proletariat. In the USA, the number of self-employed dropped in proportion to the whole employed population from 27% in 1910 to 13.3% in 1954. (54) (Further, even among the "self-employed" there are many persons in the same position as the proletariat.)

In the imperialist countries the proletariat comprises a vast majority of the population. According to the latest census data, its importance is as follows (in millions). (See table shown on the top of the following page.) (55)

The organizational role of the bourgeoisie in the process of production has diminished even more than its numerical strength. Although the monopolies already occuped a dominant position at the beginning of this century and there

	England	USA	FGR
Total gainfully employed population	22.6	60.0	22.0
Wage and salary earners	20.9	49.3	15.6
In %	93.0	82.0	71.0

was a fairly numerous section of coupon-clippers, a considerable section of the bourgeoisie took an active part in the economic life as manufacturers, organizers and managers of their own enterprises, as engineers and inventors. Practically all these functions are now performed by hired workers. Today scientific work and invention are concentrated primarily in the laboratories of the big monopolies. All the fruits of the labor of scientists or inventors belong to the monopolies and not to these scientists and inventors. A very large and constantly growing section of the bourgeoisie is becoming parasitical, developing into rentiers. The incomes of the rentiers in the USA were as follows in 1958 (in billion dollars): dividends — 12.3, personal inincomes in the form of interest — 19.4, making up a total of 31.7 billion dollars. (56) In the USA the parasitical income exceeds the whole national income of India with its population of four hundred million.

Economic power is being concentrated to an increasing degree in the hands of the financial oligarchy. By means of intricate manipulations with preferred stock, branch companies, holding companies, etc., the financial oligarchy deprives ordinary shareholders of their rights, converting them into passive recipients of dividends. The power of the financial oligarchy over the economy and policy of capitalism is constantly growing, (57) although bourgeois democracy more or less camouflages this fact in order to conceal it from the working people.

Consequently, the modern capitalist society of the advanced countries consists of a very limited group of the financial oligarchy and of other exploiters (the middle bourgeoisie, landlords and kulaks), and wage and salary-earners who make up a vast majority of the population. The number of people interested in the preservation of the capitalist system is constantly dwindling. The capitalist system continues in existence only because the bourgeoisie still manages, with the aid of religion, reformism and other forms of bourgeois ideology, to keep a section of the workers under its influence.

(2) State monopoly capitalism, which originated at the time of the First World War, has reached its full development. Its basic manifestations are: state regulation of the economy; state enterprises; withdrawal and redistribution by the state of a large share of the national income.

The essence of state monopoly capitalism lies in the combination of the forces of the monopolies and the state for a two-fold purpose: the preservation of the capitalist system and redistribution of the national income through the state in favor of monopoly capital.

In their defense of the capitalist system the monopolists have the support of the non-monopolistic bourgeoisie, the rentiers, landlords and kulaks, i.e., of the propertied classes. But by changing the distribution of the national income in their favor through the medium of state monopoly capitalism, and doing so to the disadvantage of all the other classes, the monopolists are widening the gulf between themselves and other propertied classes and furthering their isolation in society.

State regulation of the economy and state property are by no means the ideal of the monopolists. They resort tc
when capitalism is threatened with danger: during wo
wars and at the time of grave crises of overproductio
times they agree to nationalization, but to the national
tion of unprofitable branches of the economy only, giv
profitable compensation. But when they feel that their
tions are strong, they demand and obtain the abolition
limitation of state control and the return to private ha
of the state enterprises. (58) State monopoly capitali
is, therefore, developing in these directions unevenly.

Redistribution of the national income through the m
of the state budget is becoming an increasingly wider
tice. Federal expenditures in the USA were as follow
billion dollars):

1900	1930	*Preliminary data			19
		1938	1945	1950	
0.5	3.4	7.2	100.4	40.1	

* Preliminary data.

The state is now taking from its citizens more than
quarter of the national income, redistributing this vas
amount in favor of the monopolies. The percentage of
taxes (federal, state and local) in relation to the gros
tional product (59) is:

West Germany	France	England	Italy	U
32.5	31.1	29.2	28	2

All the activities of the state in the imperialist cou
serve directly or indirectly the interests of monopoly
tal. Through its apparatus of violence the state defen
capitalist system, also using for these purposes the t
tion exacted from the victims of this sytem; it places
most profitable military orders with the monopolies;
imposes high tariffs in order to limit imports, thus h
the monopolists to establish high monopoly prices in
home market; it grants loans to other countries in or
that they should buy goods from the monopolies, etc.

State monopoly capitalism is profoundly reactionar
is this which sharply distinguishes it from state capit
which played a progressive role by stimulating the de
ment of the productive forces at the initial stage of th
velopment of capitalism and similarly in the underdev
countries today.

(3) Militarization. The financial oligarchy, which
state of constant fear of the socialist revolution, has
ried through comprehensive militarization: producti
gineering and science are used primarily for armam
Outlays on armaments in "peacetime" have reached
cedented proportions. Military expenditures of the U
amounted to 191 million dollars in 1900 and to more
40,000 million dollars in 1958.

Militarism is the most striking evidence of the dec
modern capitalism. Armaments are neither means
duction, nor means of normal consumption. Military
penditures do not benefit the people in the least; they
stitute a tremendous faux frais of the capitalist soci
represent in essence a deduction from the national i
But they are a profitable business for influential gro
monopoly capital. That is why monopoly capital res

mands of the people for ending the "cold war," for e disarmament. Disarmament has become an issue er class struggle within capitalism.

Absence of a single capitalist market. As distinct he situation at the beginning of this century, there is gle capitalist market today. Territorially contracted, pitalist market is divided into the sterling, dollar and currency zones. Owing to fixed lists of goods, prefer- tariffs and the absence of most favored nation's treat- conditions of competition vary markedly for capital- different countries. There is no free movement of l; permission is necessary for the export of capital, state takes this export upon itself, sparing the olies the risks it entails, etc. Although attempts have nade to create a single market for several countries, example the Common Market of six European coun- headed by West Germany, or the Outer Seven mar- der British leadership, the contradictory interests of ferent monopoly groups act as a strong obstacle to attempts, counterposing one group of European coun- o another.

absence of a single capitalist market is evidence of stable nature of the capitalist economy. It has t about a very uneven distribution of world money Little Switzerland with a population of 5 million has reserve of 2 billion dollars, while France with a pop- of 44 million has less than 1 billion dollars; India, population of almost 400 million, has a gold reserve of illion dollars.

Inflation. An indication of the instability of the mod- pitalist economy, as compared with that at the begin- f this century, is the inflation which affects the cur- s of all the capitalist countries. Even in the USA, s colossal gold reserves, the purchasing power of the has dropped by 24% in the last ten years, judging by lex of prices for consumer goods.

drop in the purchasing power of money is not only a quence of inflation, it is also a result of the practices monopolies. In May of 1959 the index of prices in the as (1947-1949 taken as 100):

ni-	Steel	Furniture	Textiles	Leather goods	Foodstuffs
:	170	124	94	118	108

re is no doubt that the value (i.e., the socially neces- abor time contained in a unit of goods) of aluminum, el, has declined more than the value of furniture, or her goods. The fact that the prices of these goods rown much more than the prices of the less monopo- oods is indicative of the power of the monopolies.

basis of inflation lies in the withdrawal from the na- income for non-productive purposes during and after cond World War of greater sums than warranted by rmal functioning of capitalism.

s this mean that capitalism is no longer capable of a stable currency in general? No. A stable cur- would have been possible for the majority of the capi- countries even today. But this is unwelcome to the rial monopolies. "Slow" depreciation of money cre- nditions for the class struggle which are very favora- capital: depreciation of money leads to a continuous in real earnings, and the wage and salaried workers re have to fight for nominal wage and salary increases. The result is an illustion that the working class is constantly conducting an offensive, while the capitalists are defending themselves. Furthermore, the latter can always blame the workers for the rising cost of living. (60) In addition to this, currency depreciation makes it easier to pay debts, while the prices are raised by the monopolies in proportion to the depreciation of money, or even higher. In view of the steadily growing military expenditures and the general policy of the monopolies, it is impossible to expect any stabilization of prices.

(6) The banks and the industrial monopolies. The relationship between banking and industrial capital has changed. Dependence upon banking capital is not as great as at the beginning of this century. The coalescence of banking and industrial capital is more complete than ever before. The industrial monopolies, the banks and insurance companies are all controlled by the financial oligarchy.

At the beginning of the century, when the resources of industry were by no means adequate, it was constantly in need of bank credit, both for working capital and for the expansion of fixed capital.

In his work, Finance Capital, Hilferding wrote: "A constantly increasing share of industrial capital does not belong to the industrialists who use it. They acquire capita only through the medium of the bank." (61) This made the industrial enterprises dependent upon the banks. Today, as a rule, the industrial monopolies expand the basic capital out of their own resources.

All American corporations spent in 1958 as much as 26.5 billion dollars on the construction of plant and equipment. They had the internal resources required for this: 6 billion dollars in retained profits and 21.5 billion dollars in depreciation funds. (62)

From 67% to 89% of the capital investments in Britain in 1949-1956 came from internal resources, 7% to 11% from bond issues, and 2% to 12% from bank loans. (63)

With their super-profits, the big industrial monopolies are now in a position to create reserves which obviate the need for bank credit and enable them to found or buy big banks. Thus, the Rockefellers have purchased the Chase Bank, one of the biggest in the USA. The I. G. Farben concern of Germany had its own big bank before the Second World War.

The fact that the banks play a secondary role today, as compared with the industrial monopolies, may be seen from the following United States statistics: (64)

Net Income of the Leading Corporations in the USA After Tax Payments (in billion dollars)

Year	Total	Manufacturing industry	All financial corporations	Commercial banks
1957	15.8	10.4	1.3	0.8
1958	13.9	8.5	1.4	0.9

The net income of all financial corporations amounted to 1/5 to 1/8 of the income of the industrial monopolies. (65)

(7) The insurance companies have to a considerable degree taken over the functions of the banks and savings banks in collecting money from the population and turning it over to the industrialists. In 1955 the combined resources of the insurance companies in the USA amounted to 90 billion dollars; of these 40 billion dollars was invested in

stocks and bonds. In England, the resources of the insurance companies in 1958 amounted to 6 billion pounds sterling; of these, 2.2 billion pounds was invested in the stocks and bonds of private companies. The resources of all British banks and financial companies amounted to 11.5 billion pounds sterling. (66) The insurance companies have one great advantage over the banks and the savings banks; they are not subject to a mass withdrawal of deposits in the event of a crisis. (67) It is natural, therefore, that there is a struggle among the financial oligarchy for control of the insurance companies.

The changed relationships between the banks and the industrial monopolies do not mean, however, that the investment banks do not make any profits on the stocks and bonds of the industrial enterprises. In 1956, for example, when Ford securities were issued, the syndicate of investment banks received a commission of 15.3 million dollars, i.e., 1.5 dollars per security, although no risk was entailed for the banks.

(8) Consumer credit. Widespread consumer credit is a novel feature. The chronic limitation of the market compels the capitalists to sell goods on installment, using the future income of the consumers in advance. At the end of 1958, consumer credit in the USA amounted to 45 billion dollars. Sales on credit are also growing rapidly in England and in the other capitalist countries. The monopolies are, of course, using consumer credit for the purpose of robbing the consumers. Thus, General Motors charges 12% per annum for the installment sale of automobiles; by failing to make payment in time the debtor loses his automobile.

(9) Distribution of the burden of overproduction crises has changed. At the beginning of this century the bourgeoisie bore a considerable portion of the loss caused by crises (owing to the considerable decline in prices during crises, acute credit crises and as the result of mass bankruptcies). Today, the big monopolies do not reduce prices during crises; they do not suffer bankruptcy (if necessary, the state comes to their assistance). The hardships of the crisis are borne almost entirely by the workers in the form of long periods of mass unemployment, by the underdeveloped countries as a result of declines in the prices of their goods, and by the weaker section of the non-monopolistic bourgeoisie. The big bourgeoisie loses little though the crisis. But political crises are dangerous for it.

***

Historically the destiny of the capitalist system is already decided: it is doomed and must vanish in order to give place to a higher social system, to communism. It is hard to foretell when this process will be completed on a world scale and the forms in which it will take place. There are weighty grounds for assuming that the peace policy of the Soviet Union, the growing economic and political might of the socialist camp, and the activity of increasing sections of the masses in the capitalist countries will make it possible to prevent a third world war. It is possible that the transition to socialism in some countries will take place in comparatively peaceful forms. Marx's idea of the possibility of "buying" freedom from the bourgeoisie may become a reality in one or another country.

The following can be foreseen for a shorter period of time:

In the coming 10-15 years the USSR will outpace the USA in the economic sphere and will become the most powerful economy in the world.

The disintegration of the colonial system will be completed. The rapid economic development of the former colonies will take place with the aid of the Soviet Union and other countries of the socialist camp.

Concentration of capital and rapid technical progre
the advanced capitalist countries will lead to greater
employment and sharpen the class struggle. Its desi
prolong the existence of the capitalist system will for
capital to make certain concessions to the working cl

Cycles will tend to become shorter, because with n
ern technology the renewal and expansion of fixed cap
takes place more rapidly than before.

The struggle between the imperialist countries and
antagonistic groups in the capitalist camp is bound to
tinue. Nevertheless, fear for the fate of the capitalis
tem will work against world wars between these align

In view of the exceptional complexity of the situatic
ing the period of the historic transition from capitali
socialism, it is impossible to offer more concrete fo
casts.

Footnotes

(1) "Kratki otchet o poezdke v Indiiu General'nog
Shtaba podpolkovnika Serebrennikova" (Otchety o poe
po Indii, St. Petersburg, 1905, p. 92).

(2) We are not citing data from official sources,
would involve bulky references. All the data are not
curate; therefore, we have rounded the figures. The
data have been taken from sources of those years; la
official publications often give figures somewhat diffe
from the previous ones.

(3) Technological Trends and National Policy, Re
of the Subcommittee on Technology to the National Re
sources Committee, Washington, 1937, p. 251. We a
citing data primarily for the United States, as industr
censuses were taken regularly only there.

(4) J. Jenkes, D. Sawers, R. Stillman, The Source
Invention, London, 1958, p. 231.

(5) Estimated on the basis of the Wagenfuer worl
dustrial production index (Vierteljahrshefte zur Konj
forschung, Sonderheft 31, Berlin, 1933) and UN statis
These data are not too accurate, but are good enough
show developments.

(6) There is no information, of course, as to wha
amount of gold coins stayed in or left the country.

(7) Compared with over-all production and forei
trade, gold output was much higher than it is today.

(8) R. Hilferding, Finance Capital, Moscow, 1959
(Russian edition).

(9) In 1900 the German Reichstag consisted of 11
lords (including 15 barons, 20 counts, 6 dukes and pr
21 manufacturers, 22 clergymen, and so on. (K. D.
aev, Ocherki so istorii Germanii pachala XX veka (1
1914), Odessa, 1959, p. 70).

(10) V. I. Lenin, Collected Works, Vol. 4, pp. 347
(Russian edition).

(11) Jack Hardy, The Clothing Workers, New Yor
p. 178.

(12) G. M. Price, The Modern Factory, New York
p. 57.

(13) As early as 1899 de Leon said that "all trade
leaders were corrupted and bribed by the bosses. T
venal of them was ... Gompers, the most unprinciple
the most influential enemy of socialism within organ
bor" (M. Beer, Fifty Years of International Socialis
don, 1935, p. 111).

(14) World Economic Crises, 1848-1935, Volume
pendices, Moscow, 1937.

(15) Ibid.

(16) V. I. Lenin, op. cit., Vol. 22, p. 286.

(17) Characterisitic of the British economy of tha

act that in 1912 new capital investments in metro-
Britain totalled £ 15 million while her overseas in-
nts totalled £ 145 million. In 1913 they were £ 36
and £ 150 million respectively (W. Sombart, Das
haftsleben im Zeitalter des Hochkapitalismus, Erster
d, Munich, 1928, p. 492).
Statistisches Jahrbuch fur das Deutsche Reich, 1915,
350. The number of submarines is not given.
Ibid., 1914. Internationale Übersichten, S. 102.
T. R. Fischer. Industrial Disputes and Federal
tion, New York, 1940, p. 56.
ibid., p. 237.
R. A. Lester, Economics of Labor, New York, 1941,

Henry Ford, My Life and Work, New York, 1922,
106.
G. Hildebrand's Die Erschütterung der Industrie-
aft und des Industriesozialismus, Jena, 1910, was
frank apology for capitalism that the leadership of
ial-Democratic Party was compelled to expel its
from the party.
V. I. Lenin, op. cit., Vol. 22, p. 271.
Thus, the 8-hour day was established by law: in
y, Czechoslovakia, and Austria, in 1918; in France,
Switzerland, and Norway, in 1919; in the Nether-
1922; in Belgium and Sweden in 1923, and so on.
ur day law was passed in the United States and Brit-

The fact that the Soviet Union dropped out of the
st market was not the direct cause of this phenome-
l exports comprised about 10% to 15% of the capitalist
overall production. Exports to Russia never played
rt. In 1913 Russia accounted for only 9% of Ger-
exports; and this comprised about 1.5% of the over-
luction of Germany, one of old Russia's main sup-

A. H. Hansen, The American Economy, New York,
3.
M. Beer, Das England der Gegenwart, Berlin, 1924,

Historical Statistics of the United States, 1789-1945,
gton, 1949, p. 15.
Farm statistics are much too incomplete and highly
ble. Still it is possible to ascertain that production
ower than the population of the capitalist world. The
rvest of wheat, rye, barley, maize and rice (com-
vas: 405-475 million tons in 1920-1922 (according
nsky's estimate, Die Welt in Zahlen, III Buch. p.
5 million tons in 1934-1938; 621 million tons in 1957
cal Yearbook, UN, 1958). The increase is about
probably much greater.
The Times, July 17, 1959.
In Brazil and Chile "about 2% of the population owns
of all the land" (The Times, July 25, 1959).
The Times, October 7, 1959.
The New York Times (International Edition), April
, p. 1.
The Times, August 8, 1959.
The Economist (June 6, 1959, p. 953) wrote that
er's son and Dulles' son were Catholic priests.
The New York Times (International Edition), July 19,

ibid., July 17, 1959.
ibid., August 3, 1959.
The American Federationist, December 1958, p. 31.
Foreign Affairs, April 1959, p. 363.
The Times, July 13, 1959.
Neue Zürcher Zeitung, February 8, 1959.

(45) The Times, May 16, 1959.

(46) In Florida a ban was demanded on the well-known book Three Little Pigs because in it the wolf had devoured the white and the spotted pigs while the black little pig had outwitted the wolf. In Alabama a similar demand was made with regard to the book Two Rabbits in which a white she-rabbit married a black rabbit.

(47) Statistical Yearbook, UN, 1958, pp. 98 and 99.

(48) United States monopoly capital appropriates huge profits even in such a relatively rich country as Australia. The New Republic magazine wrote: "A storm broke out... in Australia in connection with the publication of the General Motors-Holdens Limited balance sheet. On its postwar investments in Australia, which initially amounted to only $4 million, the parent company in Detroit will get more than $16 million this year, while the profits of the General Motors-Holdens Limited will run into $34 million, which is 874% of the common-stock capital and is the highest profit ever made by any company in Australia. From this cornucopia the Australians, who own but 6% of the preferred stock, will get $39,000 (The New Republic, July 13, 1959, p. 6).

Not only individual enterprises, but all export capital yields high profits. According to a Bank of England report, the stocks of foreign enterprises equal to the nominal sum of £ 466 million yielded a dividend of £ 65 million, or 14%. Above that, a considerable part of the profits went, of course, into reserve funds.

(49) The more sober-thinking statesmen in imperialist countries do not conceal their dissatisfaction at this situation. Thus, A. Stevenson wrote in the New York Times Magazine, March 1, 1959: "Soviet economic and political penetration is formidable and succeeding ... Evidently the reality of our peril is the most difficult thing for us to accept. ... The rich nations are getting richer, while the poor are getting poorer. This is a disaster for us, the rich, which the Russians are making the most of on a world scale. As a poor nation that has pulled itself up by its own bootstraps, as it were, Russia has a great attraction for other poor nations who are natively suspicious of the West or have been disaffected by our military bargaining and self-righteous moralizing."

(50) W. Sombart, op. cit., Zweiter Halbband, p. 921; Monthly Labor Review, April 1957, p. 436.

(51) S. Hill and F. Harbison, Manpower and Innovation in American Industry, Princeton University, 1959, p. 62.

(52) The division into physical and mental labor is not suitable in this case. For the work of many office employees requires very little mental energy, while that of many factory workers requires a great deal of it.

(53) Historical Statistics of the United States, p. 97; Economic Report of the President, January 20, 1959, p. 213. The last figure, given by the Department of Agriculture, is exaggerated.

(54) Journal of the International Sociological Association, May 1956, p. 70.

(55) Statistisches Jahrbuch für die Bundesrepublic Deutschland, 1959, Internationale Übersichten, pp. 34,35.

(56) Economic Report of the President, January 20, 1959, p. 153.

(57) In his Imperialism, the Highest Stage of Capitalism, V. I. Lenin wrote that Rockefeller and Morgan at the beginning of the century controlled a capital of 11 billion marks, or 2.5 billion dollars. Victor Perlo, in his Empire of High Finance, estimates their control at 126 billion dollars (pp. 494, 497).

(58) West Germany, for example, in 1959 began to

sell to private capital not only the Volkswagen works, an enterprise of Hitler's times, but also the Preussag, which had been partially owned by the Prussian state since the 19th century. The transfer of these enterprises is accompanied by propaganda of "people's capitalism," as some stocks are sold to workers.

(59) U.S. News and World Report, April 13, 1959, p. 88.

(60) On the question of inflation, spokesmen of industrial capital, the well-known American Professor Slichter and Professor Hansen, for instance, advocate controlled inflation, quite like the Keynes school, while banking capital, as the First National City Bank or the Guaranty Trust Company, favor a stable currency.

(61) R. Hilferding, Finance Capital, Moscow, 1959, p. 301 (Russian edition).

(62) Economic Report of the President, January 20, 1959, p 207.

(63) Bulletin for Industry, London, April 1959.

(64) First National City Bank, Monthly Letter: Bu and Economic Condition, March 1959, p. 21.

(65) It is significant that in 1958, when mainly pro appropriated in the recession years of 1957 and 1958 reported, bank profits rose while industrial profits d considerably. Hence, the banks are waxing rich on o people's troubles.

(66) Data of the Radcliffe report (The Economist, 22, 1959).

(67) The insured may discontinue their insuranc and demand a refund. This, however, entails big losses. Moreover, the insurance companies may, formal reasons put off payment until after the cre crisis.

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KOZLOV (Continued From Page 15)

effektivnosti kapitalovlozhenii v sotsialisticheskom khoziaistve," Voprosy Ekonomiki, 1957, No. 2, pp. 106-121.

(5) With respect to the logging industry, the actual production cost per cubic meter of wood entered in the accounting department's books increased for various reasons during the period under examination, and its dynamics do n correspond to changes in the outlays of social labor.

(6) Vneocherednoi XXI s'ezd Kommunisticheskoi par Sovetskogo Soiuza, Stenograficheskii otchet, I chast, p. 172.

KHEINMAN (Continued From Page 42)

actions, employed in the industrial production process by means of checking a small portion of the goods produced in the current period, of analyzing the quality of the goods being checked, and of deciding on actions to be performed in order to maintain an appropriate level of quality of Industrial Engineering Handbook, 1956, pp. 6-83. [T lator's note: This citation is retranslated from the sian.]

FEIGIN (Continued From Page 47)

The advantages of planned location of productive forces and the all-round development of the economic regions in our country and in other socialist countries appear in even more striking relief against the background of the elemental distribution of productive forces in capitalist countries with their antagonistic contradictions. These advantages will steadily multiply, thanks to the development of the w socialist economic system and the international soci division of labor. These advantages should be profo studied under new conditions, so that they may be us the fullest extent to accelerate the building of the m technical base of communism.

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